Request for Proposals

for

Consulting Services

for the

Palms Park Community Center Improvements Project

CITY OF LAKEWOOD

PUBLIC WORKS

In Accordance with Federal and State Requirements

Pursuant Title 2 of the Code of Federal Regulations (CFR) Part 200

July 10, 2025

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SECTION 1 - ADMINISTRATIVE INFORMATION

A. Agency Contacts

For RFP related questions, please contact:

Name:	Kevin Yamakawa, PE
Title:	Principal Civil Engineer
Phone:	(562)866-9771, ext. 2506
Email:	Kyamakawa@lakewoodca.gov

B. Attachments

Attachment A:	Conflict of Interest Form
Attachment B:	Certification Regarding Lobbying
Attachment C:	Non-Collusion Declaration
Attachment D:	Sample Professional Services Agreement
Attachment E:	DRAFT Project Plans
Attachment F:	DRAFT Project Specifications

C. Due Date

Proposals must be submitted by 08/07/2025 at 5:30 PM.
See “Instructions” in the Submission Requirements section of this document for details.

D. Schedule of RFP Events

Request for Proposal Issued	07/10/2025
Proposals Due	08/07/2025
Possible Interviews with Short-List (30-minute)	Week of 08/18/2025
City Council Approval (tentative)	09/09/2025

SECTION 2 – INTRODUCTION

A. Purpose

The City of Lakewood ("City") Public Works Department is seeking qualified consultant firms (herein after referred to as "CONSULTANT") to assist the City's staff by providing consulting services during the construction of the Palms Park Community Center Improvements Project.

The project includes Federal and State Grant funding sources to supplement local funding. The City is finalizing the project plans and specifications and anticipates advertising the project for construction this upcoming fall (2025), following a pre-qualification process to be led by CONSULTANT. In general, the CONSULTANT scope of services would be in the following categories during the construction of the project:

A. Project Management;
B. Construction Management and Inspection;
C. Construction Material Testing and Inspection;
D. Labor Compliance Services.

The purpose of this RFP is to obtain proposals from firms interested in working as the CONSULTANT with the City of Lakewood, Public Works Department on the Palms Park Community Center Improvements project. Subject to City Council approval, the City also anticipates future additional building remodel and renovation projects of a similar nature and funding sources within the next three years. Specific consulting services for such additional projects are not included in the scope of services of this RFP. However, Proposals submitted in response to this RFP will be considered statements of qualification (SOQ) for these anticipated future similar projects and the City may utilize the SOQ for future work assignments.

Certain labor categories under this project may be subject to prevailing wages as identified in the State of California Labor Code commencing in Section 1770 et. seq. These labor categories when employed for any work on or in the execution of a "Public Works" project require payment of prevailing wages.

This public works construction project is also funded in whole or in part with federal funds. Accordingly, federal labor standards provisions including prevailing wage requirements of the Davis-Bacon and Related Acts (DBRA) will be enforced. In the event of a conflict between Federal and State prevailing wage rates, the higher of the two will prevail. The Davis-Bacon and Related Acts, apply to contractors and subcontractors performing on federally funded or assisted contracts in excess of $2,000 for the construction, alteration, or repair (including painting and decorating) of public buildings or public works. Davis-Bacon Act and Related Act contractors and subcontractors must pay their laborers and mechanics employed under the contract no less than the locally prevailing wages and fringe benefits for corresponding work on similar projects in the area. The Davis-Bacon Act directs the Department of Labor to determine such locally prevailing wage rates. The Davis-Bacon Act prevailing wage provisions apply to the Related Acts, under which federal agencies assist construction projects through grants, loans, loan guarantees, and insurance.

The CONSULTANT assures that neither it nor any of its principals is presently debarred, suspended,proposed for debarment, or declared ineligible or voluntarily excluded from participation

in this transaction by any federal department or agency in accordance with the requirements of Executive Order 12549 and 12689, 2 CFR Part 180.26.4.2

This is a federally-assisted construction project. Each CONSULTANT and all subconsultants are required to:

a. Be registered in SAM.gov before submitting its application;
b. Provide a valid unique entity identifier (UEI) in its application; and
c. Continue to maintain an active SAM.gov registration with current information at all times during the Project duration. Failure to do so shall be just cause for annulment of the award.

This solicitation does not commit the City of Lakewood to pay any cost incurred in the preparation of a response. In addition, the proposal should be limited to 10 single-sided pages not including attachments. The City of Lakewood reserves the right to withdraw this solicitation at any time for any reason. All firms preparing a proposal will be duly notified of any change in the status of this solicitation. The successful CONSULTANT shall file insurance coverage and provide indemnification provisions which contain hold harmless clauses in favor of the City as described in the Professional Services Agreement in Attachment "D".

B. Project Description

The Palms Park Community Center is located in east Lakewood at 12305 207th St, Lakewood, CA 90715. The purpose of the Palms Park Community Center Improvements project is to provide infrastructure reinvestment and renewal due to the age and the condition of the facility. The project scope includes the addition of a new ADA Compatible restroom, path of travel improvements, storefront improvements, flooring and ceiling renovation, asbestos abatement, roof replacement, HVAC system replacement, electrical improvements, lighting upgrades, exterior repairs, renovation of office, storage and assembly room spaces, and some parking hardscape improvements.

The project will include local funds as well as funding from federal and state agencies, inclusive of Community Project Funding/Congressional Directed Spending (CPFCDS) and the California Department of Parks and Recreation Office of Grants and Local Offices. The construction engineer's estimate is $7.5 million and construction duration is approximately 12 months.

SECTION 3 – SCOPE OF SERVICES

A. Requirements

CONSULTANT personnel will provide assistance to and work under the direction of a City of Lakewood Public Works' representative. CONSULTANT is expected to establish and maintain a close working relationship with the City of Lakewood's staff throughout the project.

The CONSULTANT shall provide a Project Manager (single point of contact) to coordinate with the City of Lakewood. CONSULTANT'S Project Manager shall be accessible during normal working hours. If at any time the level of performance falls below expectations, the City may release a CONSULTANT'S employee and request another person be assigned as needed and shall be approved by the City prior to commencing any duties. CONSULTANT'S Project Manager shall be responsible for all matters related to the CONSULTANT'S personnel and operations, including but not limited to:

1. Assigning lead and supporting personnel to the project on an as-needed basis;

2. Administering personnel actions;

3. Submitting resumes containing the qualifications and experience of CONSULTANT'S personnel if required;

4. Responding to a variety of administrative requests from the City, i.e., billing questions, insurance renewals, etc.

B. Scope of Support Services

Construction Management support duties may include but not be limited to:

- Review and understand the scope of work for the project including the plans, specifications, budget and cost estimates.
- Conduct a contractor pre-qualification process in accordance with California Department of Industrial Relations (DIR) regulations and all applicable funding requirements. Detailed information on DIR pre-qualification requirements can be found at: https://www.dir.ca.gov/prequal.htm
- Provide assistance to staff throughout the bidding and construction contract award process. This includes, but is not limited to, organizing and facilitating all required pre-bid meetings.
- Arrange and conduct pre-construction meetings, inviting general contractor and project stakeholders. Provide assistance in responding to all questions in a timely manner. Prepare minutes of pre-construction meeting for distribution to all attendees.
- Establish a records management system and maintain all records, ensure that reporting requirements are met for all funding sources, grant requirements and city files.
- Provide and maintain sufficient field personnel to administer and manage construction contract.
- Review the construction schedule, including activity sequences and duration, schedule of submittals and delivery schedule of long lead materials and equipment. Review contractor's update and revisions as may be required to reflect actual progress of work.
- Schedule and conduct progress meetings to discuss contract issues, procedures, progress, problems, change orders, submittals, request for information (RFIs), deficiencies and schedules. Prepare minutes of progress meetings for distribution to all attendees.
- Process and approve contractor's submittals for City staff and process project design consultant's review and approval.
- Process and track RFIs, submittals, shop drawings, proposed change orders and revisions.
- Review and evaluate proposed change orders. Review estimates for reasonableness and cost effectiveness and render recommendations to City.
- Maintain cost accounting records on authorized work performed under contract unit costs and additional work performed based on actual costs of time (labor) and materials (T&M).

- Review contractor submittals for extra or unforeseen work and coordinate the review by the design consultant in a timely manner in accordance with the requirements of project specifications.
- Review potential Construction Change Orders (CCO) for accuracy and provide recommendation(s) to the City Project Manager for proper course of action and processing of CCO's.
- Develop a reasonable cost control system, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes. Identify variances between actual and estimated costs and report such variances to City at regular intervals.
- Assist City staff in selecting consultants, using the City's qualifications-based selection process, to fulfill project professional services needs not otherwise in this scope of work.
- Assist City in coordinating services of other consultants (geotechnical, NPDES, materials testing, deputy inspection, special laboratory testing, etc.) that may be hired or selected for the project.
- Coordinate with project designer the contractor's requests for interpretation or clarification of meaning and intent of project plans and specifications.
- Establish and implement job safety procedures in compliance with CAL-OSHA requirements. Monitor contractor's compliance with established safety program, respond to deficiencies and hazards, and investigate and report on accidents.
- Track quantities of work completed for progress payments. Develop and implement procedures for review and processing of progress payment applications. Assist City with review and certification for payment.
- Establish procedures and monitor contractor compliance with federal and state prevailing wage regulations and requirements.
- Perform quality assurance reviews on a regular basis and recommend changes, as necessary.
- Comply with local, federal and state grant funding requirements. Assist City in preparing and processing reimbursements.
- Provide coordination with Public Works staff, other City departments, Los Angeles County (LAC) Building Department, other agencies, utilities, facility customers and community as required.
- Provide grant administration including coordination with the awarding agency; ensuring compliance with grant requirements; preparing interim and final reports; and participating in grant audits, if required.
- Maintain a complete project filing system.
- Prepare documentation required for invoicing.

<u>Post-Construction Phase</u>

- Evaluate completion of work and recommend to City when work is ready for final inspection.
- Conduct final inspection/walk through with City staff.
- Issue preliminary and final punch list, including schedule for punch list completion. Monitor and follow through with contractor until completion of all punch list items.
- Secure and transmit required guarantees, certifications, affidavits, leases, easement deeds, operating & maintenance manuals, warranties and other documents as stipulated in contract documents.

- Secure and provide accurate and detailed “As-Built” drawings for the project in both AutoCAD (.dwg) and PDF format.
- Secure and provide neat and orderly material sheets, inspection reports,
- Review and process contractor’s request for final payment and release of retention.
- Deliver project files to City.

Construction Inspection support duties may include but not be limited to:

- Provide coordination with Public Works staff, other City departments, Los Angeles County (LAC) Building Department, other agencies, utilities, facility customers and community as required.
- Review plans, specifications, and other contract and construction-related documents. Become familiar with traffic control plans, construction schedules, construction sequences, and permit requirements from other agencies.
- Photograph, log and pre-work video prior, during, and after construction.
- Attend pre-construction meetings and present special concerns, if any.
- Interpret plans, specifications and regulations and ensure that contractors are following their contracts. Provide inspections to ensure projects are constructed according to project specifications.
- Direct and notify construction contractors about non-compliance and correct compliance problems as soon as they are discovered.
- Inspect and approve all phases of construction and improvement work to assure that the appropriate construction is completed in compliance with the plans, standards, specifications, special requirements, codes and regulations. Issue correction notices or approvals as required.
- Monitor the Contractor’s obligations to request LAC Building Department inspections and monitor Contractor’s compliance with issued corrective work requirements.
- Monitor the Contractor’s attainment of an approved final inspection by the LAC Building Department and necessary City departments.
- Maintain daily diaries showing site and weather conditions; traffic control measures taken by contractors; labor, equipment and materials used; quantity of work performed; and major incidents/safety violations. Daily diaries shall be submitted to City upon project completion.
- Review construction progress schedules on a regular basis; verify schedules are on track with project milestones; identify deviations; and ensure that corrective actions are taken to bring projects back on schedule.
- Review and recommend approval of contractor progress payment requests, final payment request and release of retention request.
- Provide accurate measurements of work completed by contractors in accordance with contract documents.
- Review soil compaction and materials testing certifications of compliance (COC). Coordinate with City’s Acceptance Testing (AT) and Independent Assurance Program (IAP) testing firms regarding quality of work completed.
- Ensure that contractors do not install materials without approved material testing certifications. Any failed tests shall be reported and direct contractor to take correction measures to achieve compliance.

- Monitor contractors' utility coordination to minimize utility conflict delays and potential need for utility relocations. Report potential conflicts to utilities, and advise them to relocate or remove conflicting utilities and report outcome to City.
- Attend progress meetings to communicate, coordinate and resolve any issues or problems that may arise at the job site. Prepare and submit to contractor a "Weekly Statement of Calendar/Working Days" report.
- Coordinate with contractor access to adjacent businesses/residents during construction. Coordinate mitigation of construction impacts with contractor, City and other agencies.
- Coordinate with design consultant and project managers on design issues encountered during construction. Work with staff and develop solutions to problems identified in the field.
- Check for proper use and placement of traffic control devices to assure compliance with the WATCH handbook or specific traffic control plan.
- Provide inspection of traffic control, channelization, and all other traffic-related work.
- Ensure conformance with plans, specifications, department regulations, applicable laws and codes.
- Observe construction safety, public safety and convenience, and report discovered problems to City.
- Monitor compliance with the City's National Pollutant Discharge Elimination System (NPDES) Permits and requirements. Monitor compliance with all other local, state, and federal laws and regulations.
- Monitor compliance with City's Construction Demolition and Recycling Ordinance.
- Maintain data for change orders and record information regarding time of dispute, time of notification by contractor, and action taken by inspector.
- Provide complete measurements and calculations to administer progress payments and make recommendations for payments.
- Prepare and transmit to contractor's correspondence related to construction management and inspection of projects. All correspondence sent to and received from contractors shall be copied and transmitted to City.
- Monitor Preliminary Notices of liens, Partial Releases of Claims with progress payments, Stop Notices, Release of Stop Notices and Full and Complete Release of Claims with Final Payment.
- Coordinate preparation and submittal of as-built plans to City upon project completion.
- Prepare preliminary and final punch list and follow through with contractor until completion.

Labor Compliance (as an optional service) support duties may include but not be limited to:

Complete understanding of Federal projects. Perform all interviews, check and documentation required on Federal projects including but not limited to the following:

- Attend any/all pre-bid and pre-construction meetings to present federal and state labor compliance requirements to construction contractor and subcontractors; prepare minutes and attendance record thereof.
- Review certified payroll records for worker classifications and completeness.
- Review certified payroll records to ensure employees are paid in accordance with the Davis-Bacon wage determination specific to that Project.

- Review Fringe Benefits Statement to ensure fringes are paid in case or to bona-fide fringe benefit plan.
- Gather documentation that apprentices and trainees are registered with Department of Labor (DOL) or an approved apprenticeship program.
- Review that the ratio of apprentices/trainees that are working on the Project are in accordance with ratios and paid the Davis-Bacon wage.
- Ensure payroll records indicate employees are paid weekly.
- Check for signed certification of Davis-Bacon compliance.
- Penalties/Sanctions - Alert the construction contractor to violations and/or labor compliance issues and take all necessary steps to resolve any such violations and/or compliance issues with the construction contractor.
- Conduct regular site visits and site interviews to monitor workforce utilization for labor compliance and DBE enforcement purposes.
- Document that site interviews were performed
- Follow up with contractor by telephone, email, and/or certified mail regarding document submittals and payroll discrepancies.

Ensure Davis-Bacon posters are on site in conspicuous places and protected from the weather.

SECTION 4 - SUBMISSION REQUIREMENTS

A. Content

1. **About your firm:** Provide firm name, address, contact, and number of years providing design, planning, and construction support services. Include synopsis of support services offered.
2. **Project team:** Include an organizational chart that depicts reporting responsibilities of proposed team members. Indicate level (percentage) of availability and include resumes for each team member and list licenses. Substitutions of project team members during the project are highly discouraged and will only be permitted with prior written approval by the City. Resumes are exempt from the 10-page proposal limit.
3. **Project related experience:** Provide three detailed examples of projects ongoing or completed within the last three years that included similar scope of services. List minimum of three references and provide phone numbers of owner's representatives.
4. **Quality Assurance Program:** Submit quality assurance program for the areas/sub-disciplines for consideration of and any other information you deem pertinent.
5. **Completed Attachment Forms:** Submit filled-out/signed forms included in attachments A, B & C. Forms are exempt from the 10-page proposal limit.
6. **Fee Schedule:** In a separate, sealed envelope, provide a total proposed fee for the scope of work for the project, and include a schedule of hourly rates, including overtime rates for applicable personnel classifications as well as reimbursables. Fee schedule will not be counted as part of the 10-page limit.

B. Instructions

The solicitation responses are to be prepared in the prescribed format and submitted electronically.

The City reserves the right to reject any or all submitted proposals, and no guarantee is made that any contract will be awarded pursuant to this Request for Proposals. All costs incurred in the preparation of the proposal and/or in the submission of additional information prior to the award of a written contract will be borne by the CONSULTANT. All proposals submitted to the City of Lakewood shall become the property of the City.

Please submit one (1) electronic copy stored on a USB memory device by 08/07/2025 at 5:30 PM to:

Kevin Yamakawa
Principal Civil Engineer
Kyamakawa@Lakewoodca.gov
5050 Clark Ave.
Lakewood CA 90712

Telephone or facsimile proposals will not be considered. Proposals received after the date of closing will not be considered. All questions relative to this RFQ must be submitted in writing or electronically to the individual listed in Section 1. A. no later than the date specified in Section 1.C.

SECTION 5 - EVALUATION CRITERIA

The City of Lakewood will use the following criteria in evaluating proposals received in response to this RFP. The evaluation of proposals and the selection of the successful proposal will be based on the information provided by the CONSULTANT in its proposal, including, without limitation, responses to the CONSULTANT'S qualifications. Consideration may also be given to any additional information helpful to City of Lakewood. The City is not bound to accept the lowest priced proposal if that proposal is not the most advantageous to the City as determined solely by City of Lakewood. A Review Board, selected by the City, will evaluate the proposals received by the submittal deadline. The firms that demonstrate the best ability to meet the City's needs may be invited to interview if deemed necessary. The Review Board shall rank the CONSULTANT based on the scoring criteria listed below.

Completeness of Proposal: Any proposal that does not contain each element described in this RFP, fully completed, initialed or executed, as appropriate, may be judged incomplete and may not be considered further.

Scoring Criteria:

A. Ability of the CONSULTANT to perform competently and proficiently in disciplines for which it is being considered as outlined in the solicitation.

B. Qualifications of the specific individuals to actually perform the work or lead the Team or firm and supervise the work product in a particular discipline.

C. Amount and quality of time the key personnel will be actively involved or supervising the Team and approving the work product

D. Experience: Demonstrated record of success by the CONSULTANT on work in the various sub-disciplines previously performed for Lakewood &/or other municipalities.

SECTION 6 - CONTRACT

If the proposed total project fee is determined to be excessive, the City reserves the right to negotiate both scope of work and fees with the selected CONSULTANT.

The City does not guarantee, either expressly or by implication, that any work or services will be required under this Agreement.

Any increase in the scope of an assignment shall be approved in advance by the Public Works Director or her representative in writing. No fee adjustment will be allowed unless said prior written approval has been issued.

CONSULTANT will be required to sign the City's standard Professional Services Agreement, a copy of which is included in Attachment "D". The City's insurance requirements are included in the standard agreement.

RESERVATIONS, ADDITIONAL. The City reserves the right to:

- Act as sole judge of the relative merits of the material mentioned in the proposals received.
- Issue a subsequent Request for Proposal or Addenda.
- Establish a short list of respondents eligible for interview after review of written proposals.
- Negotiate with any, all, or none of the respondents.
- Solicit best and final offers from all or some of the respondents.
- Award a contract to one or more respondents.
- Award more than one contract for each of the items.

ATTACHMENT 'A'

CONFLICT OF INTEREST CERTIFICATION [1]

RFP/RFQ PROCUREMENT NUMBERS (if applicable): _____

PROJECT NAME [2]: _____

APPLICABILITY: To be filled out by local agency consultants in management support role.

☐ I am an employee of a consultant under contract to the local agency that is responsible for the procuring and administering of one or more consultant contracts containing either Federal or State Funds

☐ I am in a management position with the local agency, my title is listed below and I have attached my duty statement and scope of work.

☐ I hereby certify as follows:

1. I recuse myself from all potential conflicts of interest.

2. I will no directly or indirectly participate in, manage, or oversee any consultant selection procurement process in which the consulting firm of which I am employed is competing as a consultant or subconsultant.

3. I will not directly or indirectly influence any employee, staff member, or other individual participating in any consultant selection procurement process in which the consulting firm of which I am employed is as a consultant or subconsultant.

4. I will not directly or indirectly participate in, manage, or oversee any local agency contract that is with the consulting firm of which I am employed, regardless of whether the involvement of my employer in the contract is as a consultant or subconsultant. Among other things, this includes my not being involved in approving changes in the schedule, scope, deliverables or invoices.

5. I understand that if I am involved in any local agency contract that is with the consulting firm of which I am employed, in violation of 1. or 2. Above, that local agency contract will no longer be eligible for Federal or State reimbursement because of my involvement.

☐ I certify that I have read and understand my responsibilities per 2 CFR Part 200.

☐ I fully understand that it is unlawful for a person to utilize any organization name (i.e. local agency) or auxiliary organization information, which is not a matter of public record, for personal gain

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[1] Each consultant staff working in a management support role shall complete a separate form.

[2] For on-call contracts or contracts for multiple projects, indicate accordingly.

ATTACHMENT 'B'

CERTIFICATION REGARDING LOBBYING

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of an agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,00 0 and not more than $100,000 for each such failure.

The undersigned states, to the best of his or her knowledge and belief, that:

If any funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this commitment providing for the United States to insure or guarantee a loan, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in accordance with its instructions. Submission of this statement is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required statement shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

<table>
<tr><td colspan="3">CONSULTANT/SUBCONSULTANT:</td></tr>
<tr><td colspan="3">PRINTED NAME AND TITLE OF AUTHORIZED REPRESENTATIVE</td></tr>
<tr><td>Prefix:</td><td>First Name:</td><td>Middle Name:</td></tr>
<tr><td colspan="2">Last Name:</td><td>Suffix:</td></tr>
<tr><td colspan="3">Title:</td></tr>
<tr><td colspan="2">Signature:</td><td>Date:</td></tr>
</table>

ATTACHMENT 'C'

NON-COLLUSION DECLARATION

STATE OF CALIFORNIA)
)
COUNTY OF LOS ANGELES)

The undersigned declares:

I am the _____ of _____ , the party making the foregoing bid.

The bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation. The bid is genuine and not collusive or sham. The Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid. The Bidder has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or to refrain from bidding. The Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder. All statements contained in the bid are true. The Bidder has not, directly or indirectly, submitted its bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, to any corporation, partnership, company, association, organization, bid depository, or to any member or agent thereof, to effectuate a collusive or sham bid, and has not paid, and will not pay, any person or entity for such purpose.

Any person executing this declaration on behalf of a Bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that it has full power to execute, and does execute, this declaration on behalf of the Bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____[date], at _____ [City], _____ [state].

Bidder's Name (Printed):_____

Bidder's Signature: _____
(Same Signature as on Proposal)

ATTACHMENT 'D'

AGREEMENT

FOR

[TYPE OF] SERVICES

THIS AGREEMENT, made and entered into on _____,20_____, by and between the CITY OF LAKEWOOD, a municipal corporation, sometimes hereinafter referred to as "City," and [PROVIDER], sometimes hereinafter referred to as "[TITLE SUCH AS "[PROVIDER]"]."

W I T N E S S E T H:

WHEREAS, the City desires to retain the [PROVIDER] for [TYPE OF] services in connection with the work hereafter described; and

WHEREAS, the [PROVIDER] has the necessary skills and qualifications and licenses required by law to perform the [TYPE OF] services required under this Agreement in connection with said project; and

WHEREAS, the City Council at a regular meeting held on [DATE], authorized the Mayor and the City Clerk to enter into this Agreement; and

NOW, THEREFORE, it is hereby agreed by and between the parties that:

1. DEFINITIONS. As used in this Agreement, the following definitions shall be applicable:

A. [Provider]. [Provider] shall mean:

[Firm or Company Name]
[Address]
[City], CA [zip code]
Phone: (area code) [phone number]
Fax: (area code) [fax number]
E-Mail: [email address]

B. City. City shall mean the City of Lakewood, a municipal corporation, 5050 Clark Avenue, Lakewood, California, 90712.

C. City Council. City Council shall mean the City Council of the City of Lakewood.

D. Contractor. Contractor shall mean that person or persons awarded any contract by the City to perform the work designed by the [PROVIDER].

E. Services. Services shall mean the [TYPE OF] services to be performed by the [PROVIDER] pursuant to this Agreement.

F. Work. Work shall mean the [EXAMPLE: installation, construction and development of projects] as assigned under "[TYPE OF SERVICE] Support Services" for which the [TYPE OF SERVICE] services are hereby authorized.

2. SCOPE OF SERVICES. [PROVIDER]. agrees to prepare and furnish the City, following written authorization from the City to proceed, those services as set forth in "[PROVIDER'S]." written proposal for specific projects as requested by the City.

Upon specific and separate authorization by the City, the [PROVIDER]. agrees to prepare plans and specifications and/or provide construction management for City projects, with scope of work and fee based on project-specific written proposals. Budgeted projects where the fee is less than $50,000 may be authorized by the City Manager. Budgeted projects where the fee exceeds $50,000 will require written approval by the City Council.

As applicable to the project-specific written proposal, [PROVIDER]. agrees to consult with the Director of Public Works at such reasonable times and places as may be necessary to accomplish the foregoing. In performing said services the [PROVIDER]. shall use, whenever possible, the standard specifications and forms, prepared and approved by the City for public works contracts. All drawings and specifications shall be adequate and sufficient for the City to solicit bids for the award of the contract for said work.

As applicable to the project-specific written proposal, upon approval of said drawings and specifications by the Director of Public Works, the [PROVIDER].shall furnish suitable reproducible plans, details, and special and technical specifications for the City to incorporate with its bid and contract documents for the purpose of advertising for bids to construct the work. The ENGINEER shall subsequently make any necessary corrections to each set of drawings and specifications as required by any addenda, and incorporate any changes which may be authorized during construction to develop the "as-built" drawings. The[PROVIDER].shall also prepare a list of qualified bidders and assist the City in the evaluation of the bids and the qualifications of the contractors being considered for award of contract.

As applicable to the project-specific written proposal, during the course of construction by the Contractor, the [PROVIDER]. shall provide consultation and interpretation of the plans and specifications, and shall review and approve any use of alternate equipment or materials, subject to approval by the Director of Public Works. The [PROVIDER]. shall review and approve detailed shop drawings accordingly.

As applicable to the project-specific written proposal, during the progress of the work, the ENGINEER shall make monthly estimates of the completed work and shall have the responsibility of certifying to progress payments on the construction contract. The [PROVIDER]. agrees to use reasonable diligence to protect the City against any defects and deficiency in the work of the Contractor, but it is expressly understood the [PROVIDER]. does not guarantee the performance of any contract by any contractor.

3. EXCLUSION FROM SCOPE OF SERVICES. It is agreed by and between the parties hereto that the services to be provided by the [PROVIDER] under this agreement do not include: any exclusions not listed in the project-specific proposal.

4. PAYMENT. The CITY agrees to pay [PROVIDER] for all services rendered under the Scope of Services. For and in consideration of the services performed by [PROVIDER].and when approved by the City, the City agrees to pay to [PROVIDER] on a time and material basis, at a rate determined by the Schedule attached, for services actually rendered. [PROVIDER] shall submit invoices to the Director of Public Works for approval prior to authorization of payment. The rates and fees set forth in this Agreement shall remain fixed during the fiscal year, which runs from July 1st through June 30th. At the beginning of each fiscal year, the rates may be adjusted based on the percentage change in the Consumer Price Index (CPI). The rate adjustments, if any, shall take effect on July 1st of each fiscal year, based on the most recent CPI data for the 12-month period prior to the date requested. The PROVIDER shall request to the City in writing an adjustment of rates no later than 30 days before the new fiscal year begins to request such adjustment. If the PROVIDER does not request an adjustment as specified, rates will remain in effect.

5. TIME FOR PERFORMANCE. It is understood and agreed by and between the parties hereto that time is of the essence. The [PROVIDER] agrees that he will diligently and reasonably pursue the performance of the services required by him by this agreement.

6. TERMINATION The City may terminate this Agreement at any time by giving the [PROVIDER] at least fifteen days prior written notice. In the event of termination, the City shall pay the [PROVIDER] the total value of the services of the [PROVIDER] to the final date of termination, computed in accordance with the terms and provisions of this Agreement, provided, however, that the same does not in any case exceed the maximum amount hereinbefore set forth for payment of consideration. Except as herein provided, this Agreement shall continue until the successful completion of the work and the acceptance of said work by the City.

7. CONFLICT OF INTEREST. No employee, officer, agent, or board member with a real or apparent conflict of interest may participate in the selection, award, or administration of a contract supported by the Federal award. A conflict of interest includes when the employee,

officer, agent, or board member, any member of their immediate family, their partner, or an organization that employs or is about to employ any of the parties indicated herein, has a financial or other interest in or a tangible personal benefit from an entity considered for a contract. An employee, officer, agent, and board member of the recipient or subrecipient may neither solicit nor accept gratuities, favors, or anything of monetary value from contractors.

8. DEBARRED, SUSPENDED OR INELIGIBLE CONTRACTORS OR SUBRECIPIENTS. All Contractors and Subrecipients shall comply with the requirements set forth in 24 CFR part 5 and Executive Orders 12549 and 12689, prohibiting the use of debarred, suspended or ineligible contractors or subcontractors.

9. LOBBYING REGULATION. Neither Contractors nor Subrecipients may use Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Contractors and subcontractors must disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award.

10. MAINTENANCE OF RECORDS. In compliance with the regulations and authorities under 2 CFR 200 all Contractors and Subrecipients and applicable subcontractors shall maintain adequate invoices, receipts, job records and disbursement journals and such other records for the Project for a period of three years.

11. DRUG-FREE WORKPLACE ACT. All Contractors and Subrecipients shall comply with the Drug-Free Workplace Act of 1988 and HUD's implementing regulations at 24 CFR, Part 24, Subpart F, requiring provision of drug-free workplace.

12. ASSIGNMENT AND SUBCONTRACTING. Notwithstanding any provision of this Agreement to the contrary, [PROVIDER] shall not assign, subcontract or transfer any part or portion of this Agreement, or any responsibility hereunder, without the prior written consent of the City.

13. OWNERSHIP OF DOCUMENTS. It is further agreed by and between the parties hereto that the City shall have full, complete and absolute title to all preliminary plans, drawings, reports, cost estimates, schematic drawings, and other [PROVIDER] drawings and specifications prepared by the [PROVIDER] pursuant to this Agreement, regardless of the state of completion thereof. It is further agreed by and between the parties that the City may make full and complete use of said materials so prepared for the City as it desires, and within its own discretion without

any liability of any kind whatsoever to the [PROVIDER] other than payment of compensation as provided in this Agreement.

Originals of drawings, specifications, estimates, field notes and calculations prepared by the [PROVIDER] shall be and remain the property of the [PROVIDER] with the exception, however, that an electronic CAD file, an electronic PDF copy, and mylar base copy of specifications and drawings shall be provided the City, in which the City shall have full, complete and absolute title. The use by the City of the aforementioned documents, title to which is vested in the City pursuant to this paragraph, in any subsequent project in which the [PROVIDER] has not been retained, shall be at the sole risk and responsibility of the City, and the [PROVIDER] shall not be responsible to the City for any errors or omissions in respect to said materials.

14. INDEPENDENT CONTRACTOR. It is expressly understood and agreed that [PROVIDER] has been retained as an independent contractor as distinguished from an employee or agent of the City to perform the aforementioned services. [PROVIDER] acknowledges the independent contractual relationship and releases the City from any liability or obligation to make deductions or withhold for the compensation of any officer, agent or employee thereof, in respect to unemployment, income tax, disability, social security, health, pension or retirement benefits. It is expressly understood that no officer, agent or employee of [PROVIDER] shall have any City status or benefit, including health, retirement and workers' compensation benefits.

[PROVIDER] shall cover all its officers and employees where required by law with workers' compensation insurance or benefits. [PROVIDER] does hereby assume all risk to himself, his personnel, subcontractors and agents and employees thereof for personal injury or death, and all risk of property damage or loss to any property, wares, vehicles and materials from whatever sources and further releases the City, its officers and employees from any liability therefor.

[PROVIDER] certifies that he is aware of the provisions of the Labor Code of the State of California, which require every employer to be insured against liability for workers compensation or to undertake self-insurance in accordance with the provisions of that code, and he certified that he will comply with such provisions before commending the performance of the work of this Agreement.

In the performance of this agreement, [PROVIDER] shall comply with all applicable provisions of the California Fair Employment Practices Act (California Labor Code Sections (410 et seq.) and the applicable equal employment provisions of the Civil Rights Act of 1964 (42 U.S.C. 200e 217), whichever is more restrictive.

15. LIABILITY AND INDEMNIFICATION. [PROVIDER] shall indemnify the City, its officers, employees and consultants, from any claims, losses, damages, costs or expenses to the extent that such claims, losses, damages, costs or expenses arise out of, pertain to or relate to the negligence, recklessness or willful misconduct of the [PROVIDER], its employees, consultants, or agents.

The [PROVIDER] at all times during the term of this Agreement, shall maintain and keep in full force and effect, and deposit with the City, insurance or a Certificate of Insurance which

shall evidence the fact that the [PROVIDER]has in full force and effect a comprehensive personal injury and property damage policy protecting the [PROVIDER] and the City from liability in the following policies of insurance with minimum limits as indicated below and issued by insurers with A.M. Best ratings of no less than A-: VI:

- Commercial general liability at least as broad as ISO CG 0001 (per occurrence) $1,000,000; (general aggregate) $2,000,000
- Commercial auto liability at least as broad as ISO CA 0001 (per accident) $1,000,000.

Said policy shall contain a provision that the same cannot be canceled without at least thirty (30) days notice to the City thereof, unless canceled for non-payment, then ten (10) days notice shall be given and shall name the City as an additional insured.

- Worker's compensation - Statutory

Said policy shall contain a provision that the same cannot be canceled without at least thirty (30) days notice to the City thereof and shall name the City as an additional insured.

16. RESERVATION OF RIGHTS. Nothing in this Agreement shall be deemed to bind the City to any course of conduct other than its obligation hereunder to pay the [PROVIDER] for said services as rendered. It is understood that the City reserves the complete right within its discretion to reject all or any part of any design, plan, specification or recommendation made to it or submitted by said [PROVIDER], and in that regard the only responsibility of the City shall be to pay said [PROVIDER] for services as rendered. It is further understood that acceptance herein by the City of any design, plan or specification of the [PROVIDER] shall be for the purpose of compensating the [PROVIDER] only, and shall not be binding on the City as to any further course of action. The City reserves the complete right to authorize the completion and construction of any phase of the work, or to deviate from said construction plan in any degree, or to discharge the [PROVIDER] in accordance with the terms and provisions of this Agreement.

17. NOTICE. Any notice required to be given hereunder shall be deemed to have been given by depositing said notice in the United States mail in an envelope bearing the proper amount of postage thereon, and addressed as follows:

TO CITY:

City of Lakewood
5050 Clark Avenue
P.O. Box 158
Lakewood, California 90712

TO [PROVIDER]:

[Company Name]
Company Address]
[City], CA [Zip Code]

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed the day and year first above written.

CITY OF LAKEWOOD

By _____
Mayor

ATTEST:

_____
City Clerk

[PROVIDER]

By:_____
[Provider Name]
[Company Name]

APPROVED AS TO FORM:

_____
City Attorney

DRAFT - PROJECT PLANS

PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

CITY OF LAKEWOOD PUBLIC WORKS

PW-23-01

CM SET

06.26.25

VICINITY MAP

NO SCALE

PROJECT ADDRESS

12305 207TH ST
LAKEWOOD, CA 90715

SCOPE OF WORK

PROJECT: PALMS PARK COMMUNITY CENTER

SCOPE:

WORK INCLUDES:

REPAIRS INCLUDE:
- REPLACEMENT OF RESTROOM FINISHES AND FIXTURES.
- NEW FINISHES, PAINTING AND TRIMS PER FINISH PLANS.
- REPLACEMENT OF EXISTING CEILINGS PER RCP PLAN.
- REPLACEMENT OF EXTERIOR MATERIALS, PER EXTERIOR ELEVATIONS.
- REPLACEMENT OF DOORS, STOREFRONTS AND WINDOWS PER DOOR AND WINDOW SCHEDULE.
- REMOVAL OF EXISTING OUTDOOR PATIO AREA.
- REPLACEMENT OF EQUIPMENT, FIXTURES, AND FINISHES AT WARMING KITCHEN 129 INTENDED FOR WARMING, CATERING, AND COMMUNITY USE ONLY. ADJACENT STORAGE ROOM 126 IS NOT INTENDED FOR FOOD STORAGE

ALTERATIONS INCLUDE:
- RECONFIGURATION OF RESTROOMS TO MEET ADA COMPLIANCY.
- RECONFIGURATION OF DRINKING FOUNTAIN TO MEET ADA COMPLIANCY.
- RECONFIGURATION OF STAFF OFFICES AND ADJACENT ROOMS.
- FIRE ALARM SYSTEM
- MODIFICATION OF EXISTING PARKING LOT 6

ADDITIONS INCLUDE:
- ADDITION OF 1,289 SF NEW SPACES INCLUDE, ZONE/TEEN ROOM, IT/AV, MEN'S RESTROOM, SINGLE RESTROOM AND ADDITIONAL STORAGE.
- ADDITIONAL ENTRY STOREFRONT, ASSEMBLY STOREFRONT, WINDOWS AND DOORS, PER DOOR AND WINDOW SCHEDULE. 1
- FIRE SPRINKLER SYSTEM

SITE & ZONING INFORMATION

ADDRESS: 12305 207TH ST, LAKEWOOD, CA 90715

JURISDICTION: CITY OF LAKEWOOD

AIN: 7057-005-912

ZONING: O-S

BUILDING INFORMATION

YEAR BUILT: 1977

NUMBER OF STORIES: 1 STORY

BUILDING AREA:
ALLOWED V-B, SPRINKLERED: 24,000 SF
EXISTING: 13,300 SF
ADDITION: 1,360 SF
PROPOSED: 14,660 SF

OCCUPANCY A-3
(CBC CHAPTER 3)

TYPE OF CONSTRUCTION:
(CBC TABLE 601)
BUILDING: V-A (EXISTING), V-B, THIS APPLICATION
SPRINKLER: YES, THIS APPLICATION 7

FOR DETAILED CODE ANALYSIS SEE SHEET G0-02

PROJECT IMAGE

PROJECT DIRECTORY

OWNER / APPLICANT
CITY OF LAKEWOOD
5050 CLARK AVENUE
LAKEWOOD, CA 90712
PHONE: 562.866.9771 EXT. 2505

CIVIL ENGINEER
KIER + WRIGHT
163 TECHNOLOGY DRIVE, SUITE 150
IRVINE, CA 92618
PHONE: 949.508.0202

ARCHITECT
DAHLIN GROUP
505 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CALIFORNIA 92618
PHONE: 949.250.5780

STRUCTURAL ENGINEER
DCI ENGINEERS
2600 MICHAELSON DRIVE, SUITE 930
IRVINE, CA 92612
PHONE: 949.892.4970

ENVIRONMENTAL / HAZMAT
OMEGA ENVIRONMENTAL
4570 CAMPUS DR, SUITE 30
NEWPORT BEACH, CA 92660
PHONE: 949.252.2145

MECHANICAL & PLUMBING ENGINEER
POCOCK DESIGN SOLUTIONS, INC.
14451 CHAMBERS ROAD, SUITE 210
TUSTIN, CA 92780
PHONE: 949.417.3903

ELECTRICAL ENGINEER
FBA ENGINEERING
150 PAULARINO AVENUE, SUITE A120
COSTA MESA, CA 92626
PHONE: 949.852.9995

LANDSCAPE ARCHITECT
VERDE DESIGN
3685 MAIN STREET, SUITE 350
RIVERSIDE, CA 92501
PHONE: 951.221.3142

SIGNAGE
VASIN SIGN SOLUTIONS
23122 ALCALDE DRIVE, SUITE E
LAGUNA HILLS, CA 92653
PHONE: 949.382.6366

COST ESTIMATING
CUMMINGS GROUP, INC
130 VANTIES DRIVE, SUITE 110
ALISO VIEJO, CA 92656
PHONE: 949.334.8868

CODE REFERENCES

2022 LA COUNTY BUILDING CODE

2022 CALIFORNIA BUILDING CODE (CBC)

2022 CALIFORNIA ELECTRICAL CODE (CEC)

2022 CALIFORNIA MECHANICAL CODE (CMC)

2022 CALIFORNIA PLUMBING CODE (CPC)

2022 CALIFORNIA ENERGY CODE

2022 CALIFORNIA FIRE CODE (CFC)

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGreen Code)

2022 CALIFORNIA EXISTING BUILDING CODE (CEBC)

CITY OF LAKEWOOD MUNICIPAL CODE

CITY STAMP

GENERAL NOTES

DEFERRED SUBMITTALS

THE FOLLOWING ARE DESIGN-BUILD ITEMS TO BE PROVIDED BY THE CONTRACTOR, AND REQUIRE OUTSIDE ENGINEERING AND SEPARATE SUBMITTALS TO THE BUILDING DEPARTMENT FOR REVIEW AND PERMITTING. SUBMIT ITEMS TO THE CM FOR REVIEW AND APPROVAL PRIOR TO CITY REVIEW.

- FIRE DETECTION AND FIRE ALARM SYSTEM*
- FIRE SPRINKLER SYSTEM*
- EMERGENCY VOICE/VOICE ALARM COMMUNICATION SYSTEM
- HPL PANEL SYSTEM ANCHORAGE
- STOREFRONT SYSTEM

* INSTALLATION OF FIRE ALARM SYSTEMS CANNOT START UNTIL A PERMIT HAS BEEN ISSUED BY THE LOS ANGELES COUNTY FIRE DISTRICT AND LOS ANGELES COUNTY.

FIRE PROTECTION NOTES

- PROVIDE SEMI-RECESSED FIRE EXTINGUISHER CABINETS AND FIRE EXTINGUISHERS - 75' RUNNING DISTANCE MINIMUM FROM ANY POINT WITHIN THE BUILDING. PAINT CABINET TO MATCH ADJACENT WALL SURFACE. PROVIDE UL LISTED CABINETS WHERE INSTALLED IN RATED WALLS. "JL INDUSTRIES" NO. 1015610 WITH SAF-T-LOK OR APPROVED EQUAL. REFER TO G1-21 FOR LOCATIONS.
- FIRE SPRINKLER SYSTEM SHALL BE DESIGN BUILD. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL HEAD LOCATIONS WITHIN THE BUILDING, INCLUDING PERMITS AND REQUIRED DRAWINGS BY THE GOVERNING JURISDICTION TO COMPLY WITH ALL APPLICABLE CBC, NFPA, AND LOCAL CODES AND ORDINANCES.
- PROVIDE AN APPROVED MANUAL FIRE OR AUTOMATIC SMOKE DETECTION SYSTEM IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN FIRE CODE 907.

ACCESSIBILITY NOTES

- ALL CODE SECTIONS AND FIGURES ARE BASED ON THE 2022 CALIFORNIA BUILDING CODE (T-24) U.O.N.
- THE DETAILS AND DIAGRAMS ILLUSTRATE THE SPECIFIC REQUIREMENTS & GUIDELINES OF THE ACCESSIBILITY REGULATIONS AND ARE ONLY TO BE USED AS AN AID FOR BUILDING, DESIGN AND CONSTRUCTION. THEY DON'T REFLECT THE ACTUAL CONDITIONS. REFER TO THE CIVIL AND LANDSCAPE DRAWINGS FOR FURTHER INFORMATION REGARDING SITE. REFER TO THE MECHANICAL, PLUMBING, ELECTRICAL, AND ARCHITECTURAL DRAWINGS FOR GENERAL BUILDING DESIGN REQUIREMENTS.
- FOR INFORMATION NOT PROVIDED IN DIAGRAMS SEE NOTES ON G300 SERIES.

CONTRACTOR NOTES

GENERAL CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION RELATED TO THE INSTALLATION AND ASSOCIATED REQUIRED TESTS AND INSPECTIONS PRIOR TO COVERING OR CONCEALING THESE MATERIALS.

CONSTRUCTION & WASTE MANAGEMENT PLAN

PURSUANT TO THE CALIFORNIA GREEN BUILDING CODE (2016 CALGREEN), THE CITY OF LAKEWOOD REQUIRES THAT CONTRACTORS COMPLETE A CONSTRUCTION WASTE MANAGEMENT PLAN (CWMP) FOR THE REDUCTION OF WASTE PRODUCED FROM DEMOLITION AND CONSTRUCTION WORK PERFORMED WITHIN THE CITY. ANY DEVIATION OR MODIFICATION TO THE CWMP MUST BE APPROVED IN ADVANCE BY THE PUBLIC WORKS STAFF.

THE CONSTRUCTION WASTE MANAGEMENT PLAN (CWMP) MUST DEMONSTRATE THAT THE PROJECT WILL ACHIEVE A MINIMUM OF 65% MATERIAL RECOVERY. MIXED C&D DEBRIS MUST BE TAKEN TO AN APPROVED FACILITY ON THE LIST IN GREEN HALO TO ENSURE THAT A 65% RECOVERY RATE IS MET.

THE CITY OF LAKEWOOD REGULATES THE COLLECTION, REMOVAL AND DISPOSAL OF ALL SOLID WASTE AND RECYCLING MATERIALS GENERATED WITHIN THE CITY, AS AUTHORIZED BY LAKEWOOD MUNICIPAL CODE. EDCO DISPOSAL IS THE CITY'S EXCLUSIVE FRANCHISE COLLECTOR FOR SUCH MATERIALS AND HANDLES PROJECT'S DEBRIS IN SUCH A WAY THAT COMPLIES WITH SB 1383 AND/OR CALGREEN STANDARDS.

IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT EDCO DISPOSAL FOR A WASTE BIN. CONTRACTOR TO ENSURE THAT EDCO DISPOSAL KNOWS YOU ARE CONTRACTING FOR "C&D RECYCLING SERVICE", SO THAT THE MATERIAL IS PROPERLY HANDLED AND WASTE DIVERTED. CONTRACTOR TO OBTAIN AND SUBMIT WEIGHT TICKETS FROM EDCO DISPOSAL INDICATING THE TYPE AND WEIGHT OF THE MATERIAL COLLECTED. THE ORIGIN OF THE DEBRIS MUST SAY LAKEWOOD.

EDCO RECYCLING & TRANSFER - SIGNAL HILL
2755 CALIFORNIA AVE
SIGNAL HILL, CA 90755
562-597-0608

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715
PW-23-01

BID SET 06.03.25

X REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **DB,JM,AF,KP**
CHECK **GM**

TITLE SHEET

SHEET
G0-00

6/26/2025 4:38:56 PM

ABBREVIATIONS

A

&	and
@	at
ABV.	Above
A.B.	Anchor Bolt
A.C.	Asphalt Concrete
A.D.	Area Drain
AL.	Aluminum
AL.K.D.	Aluminum Knock-Down
AL.S.F.	Aluminum Storefront
A.S.	As Specified
A.S.W.	Aluminum Sash Window
A.T.	Acoustical Tile
A/V	Audio / Visual
APPROX.	Approximate
ARCH.	Architectural or Arched

B

B	Base or Bottom
B.O.BM.	Bottom of Beam
B.O.C.	Bottom of Concrete
B.O.S.	Bottom of Steel
BLKG.	Blocking
BLW.	Below
BM.	Beam
BTM.	Bottom

C

C. or C.W.	Cold Water
C.J.	Construction Joint or Control Joint
C.J.	Ceiling Joist
C.L.	Center Line
C.M.U.	Concrete Masonry Unit
C.P.	Cement Paneling
CAB.	Ceramic Tile
CAB.	Cabinet
CANT.	Cantilever
CLG.	Ceiling
CLO.	Closet
CLR.	Clear
COL.	Column
CONC.	Concrete
COND.	Condenser
CONT.	Continuous
CORR.	Corridor
CPT.	Carpet
CSMT.	Casement
CTR(D).	Center(ed)
CW	Curtain Wall

D

d	Penny (nails)
D.F.	Drinking Fountain or Douglas Fir
D.H.	Double Hung
DBL.	Double
DEG.	Degree
DEPT.	Department
DET.	Detail
DIA.	Diameter
DIAG.	Diagonal
DIM.	Dimension
DISP.	Disposal
DN.	Down
DR.	Door or Drain
DRY.	Dryer
DS.	Downspout
DW.	Dishwasher
DWG(S)	Drawing(s)
DWR, D.	Drawer

E

E.B.	Expansion Bolt
E.G.	Egress Window
E.N.	Edge Nail
E.W.	Each Way
EA.	Each
ELEC.	Electrical
ELEV.	Elevation
EQ.	Equal
EQUIP.	Equipment
ETC.	Etcetera
EXIST or (E)	Existing
EXP. JT. or E.J.	Expansion Joint
EXT.	Exterior

F

F.A.U.	Forced Air Unit
F.A.M.	Fluid Applied Membrane
F.D.	Floor Drain
F.E.	Fire Extinguisher
F.F.	Finish Floor
F.G.	Fiberglass
F.C.P.	Fiber Cement Panel
F.H.S.	Flat Head Screw
F.M.	Foam Molding
F.M.	Facer Moldings
F.O.C.	Face of Concrete
F.O.F.	Face of Finish
F.O.M.	Face of Masonry
F.O. PLYWD.	Face of Plywood
F.O.S.	Face of Stud
F.S.	Floor Sink
FAB.	Fabricate
FDN.	Foundation
FIN.	Finish
FIX.	Fixture or Fixed
FL.	Floor
FLUOR.	Fluorescent
FRT.	Fire-Retardant Treated
FTG.	Footing
FURR.	Furring

G

G.D.	Garbage Disposal
G.F.I.	Ground Fault Interrupter
G.RAIL	Guard Railing
G.S.M.	Galvanized Sheet Metal
GA.	Gage, Gauge
GAL.	Gallon
GALV.	Galvanized
GAR.	Garage
GL.B.	Glass Block
GLULAM or G.L.	Glue Laminated
GYP. BD. or G.B.	Gypsum Board

H

H. or H.W.	Hot Water
H. HT. or HGT.	Height
H.C.	Hollow Core
H.M.	Hollow Metal
H.P.L.	High Pressure Laminate
H. RAIL	Handrail
H.V.A.C.	Heating, Ventilation and Air Conditioning
HB.	Hosebib
HDR.	Header
HDWD.	Hardwood
HOR.	Horizontal

I

I.C.	In Contract
I.D.	Inside Diameter
IN. or "	Inch
INCAD.	Incandescent
INFO.	Information
INSUL.	Insulation
INT.	Interior
I.G.	Insulated Glass

J

J.B.	Junction Box
JAN.	Janitor
JT. or J	Joint
JST. or J	Joist

K

K.D.	Kiln Dried
KIT.	Kitchen
KP.	Kickplate or King Post

L

L.F.	Linear Foot
L.S.	Lag Screw
LAM.	Laminate
LAV.	Lavatory
LB. or #	Pound
LITE	Vision Lite
LKR.	Locker
LNDY.	Laundry
LVR.	Louver

M

(')	Minute
M	Manual
M.B.	Machine Bolt
M.C.	Medicine Cabinet
M.D.O.	Medium Density Overlay
M.R.	Moisture Resistant
M.S.	Machine Screw
MATL.	Material
MAX.	Maximum
MECH.	Mechanical
MEMB.	Membrane
MET. or MTL.	Metal
MF.	Metal Frame
MFR.	Manufacture
MIN.	Minimum
MIR.	Mirror
MISC.	Miscellaneous
MS.	Manufactured Supplied
MUL.	Mullion
MULT.	Multiple

N

(N)	New
N.	North
N.E.	Northeast
N.I.C.	Not In Contract
N.T.S.	Not To Scale
N.W.	Northwest
NO. or #	Number
NOM.	Nominal

O

O"	Over
O.C.	On Center
O.D.	Outside Diameter
O.S.B.	Oriented Strand Board
OH.	Opposite Hand
OH.	Overhang
O.H.C.D.	Overhead Coiling Door
OPNG.	Opening
OPP.	Opposite

P

P.	Pole
P.A.	Public Address
PAT.	Patina Finish
P.C.	Precast Concrete or Pipe Column
P.F.T.	Pre-fabricated Truss
P.H.	Panel Hardware
P.L.	Property Line
P. LAM.	Plastic Laminate
P.T.	Pressure Treated
P.T.D.F.	Pressure Treated Douglas Fir
PERF.	Perforated
PERP.	Perpendicular
PL. or P.	Plate
PLYWD.	Plywood
PNL.	Panel
PNT.	Paint
POL.	Polished
PR.	Pair
PREFAB.	Prefabricated
PT.	Paint

Q

QT.	Quart

R

R	Riser or Right
R.H.	Right Hand
R.J.	Roof Joist
R.O.	Rough Opening
R.T.	Rubber Tile
R.W.L.	Rain Water Leader
RAD. or R.	Radius
RD.	Round or Road
RECP.	Receptacle
REF.	Reference
REFR.	Refrigerator(ion)(ant)
RESIL.	Resilient
REV.	Revision
RF. or R.	Roof
RFT.	Rafter
RM.	Room
RS.	Reusen (Rough Sawn)
RUB.	Rubber
RWD.	Redwood

S

(")	Second
S.	South
S. or SH.	Shelf
S.A.	Supply Air
S.A.	Supply Air Grill
S.A.F.	Self Adhered Flashing
S.C.	Solid Core
S.E.	Southeast
S.C.D.	See Civil Drawings
S.E.D.	See Electrical Drawings
S.G.	Single Glazed
S.H.	Single Hung
S.K.D.	See Kitchen Drawings
S.L.D.	See Landscape Drawings
S.M.	Sheet Metal
S.M.D.	See Mechanical Drawings
S.M.S.	Sheet Metal Screw
S.P.D.	See Plumbing Drawings
S.S.D.	See Structural Drawings
S.S.	Sanitary Sewer or Select Structural
S.V.	Sheet Vinyl
S.W.	Southwest, Shear Wall, or Stem Wall
SHR.	Shower
SHT.	Sheet
SHTNG.	Sheathing
SIM.	Similar
SK.	Sink
SKLT.	Skylight
SL.	Sliding
SPECS.	Specifications
SPKR.	Speaker
SQ.	Square
SQ. FT. or S.F.	Square Foot/Feet
SQ. YD.	Square Yard
SST.	Stainless Steel
ST.	Street or Stove
ST.G. WD.	Stain Grade Wood
STA.	Stationary
STL.	Steel
STOR.	Storage
SUSP.	Suspended
SYM.	Symmetrical

T

T. & B.	Top and Bottom
T. & G.	Tongue and Groove
T.B.	Towel Bar or Telephone Board
T.C.	Top of Concrete
T.G.	Tempered Glass
T.O.BM.	Top of Beam
T.O.C.	Top of Curb or Concrete
T.O.F.F.	Top of Finish Floor
T.O.P.	Top of Plate or Top of Pavement
T.O.R.	Top of Roof Sheathing
T.O.S.	Top of Steel
T.O.S.F.	Top of Subfloor
T.O.S.W.	Top of Stem Wall
T.O.W.	Top of Wall
T.N.	Toe Nail
T.R.A.	Toilet Room Accessories
T.S.	Tube Steel
TEL.	Telephone
TEMP.	Tempered
TER.	Terrazzo
THK.	Thick
TLT.	Toilet
TYP.	Typical

U

U.B.C.	Uniform Building Code
U.L.	Underwriter's Laboratory
U.O.N.	Unless Otherwise Noted
UC.	Undercut
UR.	Urinal

V

V.C.T.	Vinyl Composition Tile
V.I.F.	Verify In Field
V.S.W.	Vinyl Sash Window
V.T.	Vinyl Tile
VERT.	Vertical
VYL.	Vinyl

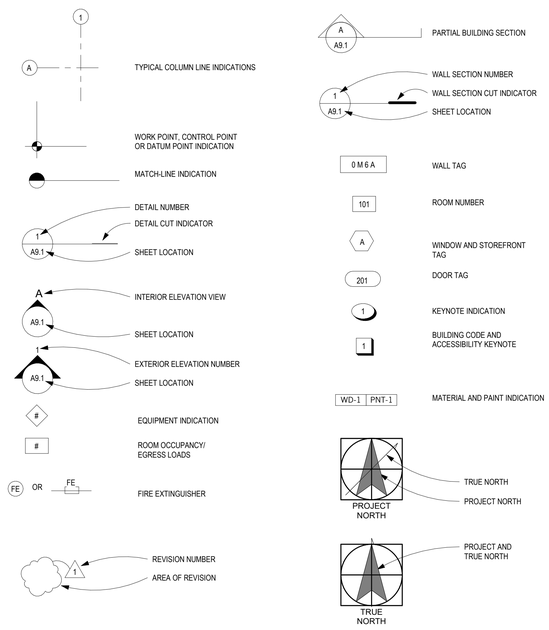
W

W.	West, Watt or Width
W/	With
W/O	Without
W.C.	Water Closet or Wall Coverings
W.F.	Wood Frame or Wide Flange
W.P.	Waterproof or Work Point
W.P.M.	Waterproof Membrane
W.R.	Water Resistant
W.S.	Weather-stripping
W.S.W.	Wood Sash Window
W.W.M.	Welded Wire Mesh
WASH.	Washer
WD.	Wood
WDW.	Window
WT.	Weight

XYZ

YD.	Yard

GRAPHIC SYMBOL LEGEND



SHEET INDEX

04 MECHANICAL

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M0.2	MECHANICAL SCHEDULES	04/08/24		
M1.1	MECHANICAL DEMOLITION FLOOR PLAN	04/08/24		
M1.2	MECHANICAL DEMOLITION ROOF PLAN	04/08/24		
M2.1	MECHANICAL RENOVATION FLOOR PLAN	04/08/24		
M2.2	MECHANICAL RENOVATION ROOF PLAN	04/08/24		
M3.1	MECHANICAL DETAILS	04/08/24		
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M3.4	TITLE 24 COMPLIANCE FORMS	07/24/24		
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05 ELECTRICAL

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E0.1	SYMBOL LIST, FIXTURE SCHEDULE	04/08/24		
E0.2	SINGLE LINE DIAGRAM	04/08/24		
E2.0	ELECTRICAL DEMOLITION PLAN	04/08/24		
E2.1	LIGHTING PLAN	04/08/24		
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06 PLUMBING

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P0.1	PLUMBING GEN. NOTES, LEGEND, AND SCHEDULES	04/08/24		
P1.1	PLUMBING DEMOLITION FLOOR PLAN	04/08/24		
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P3.1	PLUMBING ENLARGED FLOOR PLAN	04/08/24		
P4.1	PLUMBING DETAILS	04/08/24		
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07 LANDSCAPE

SHEET #	SHEET NAME	Sheet Issue Date	Current Revision	Current Revision Date
D1	IRRIGATION PLAN	04/08/24		
D2	IRRIGATION AND PLANTING DETAILS	04/08/24		
L2.1	PLANTING PLAN	04/08/24		
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00 GENERAL

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G1-10	CODE COMPLIANCE SITE PLAN	04/08/24	9	5/12/25
G1-21	CODE ANALYSIS, EXITING, AND SIGNAGE PLAN	04/08/24	7	11/01/24
G1-41	ACCESSIBILITY NOTES & DIAGRAMS COMMON ROUTES (CBC 11B)	04/08/24		
G1-42	ACCESSIBILITY NOTES & DIAGRAMS COMMON FACILITIES (CBC 11B)	04/08/24		
G2-01	2022 CALGREEN REQUIREMENTS - COMMERCIAL	04/08/24		
G2-02	2022 CALGREEN REQUIREMENTS - COMMERCIAL	04/08/24		
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01 CIVIL

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C2.0	DETAILS & NOTES	11/01/24		
C3.0	GRADING, DRAINAGE, & UNDERGROUND UTILITIES	04/08/24		
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A0-20	DEMOLITION FLOOR PLAN	04/08/24	7	11/01/24
A0-30	DEMOLITION REFLECTED CEILING PLAN	04/08/24	7	11/01/24
A0-40	DEMOLITION ROOF PLAN	04/08/24		
A0-50	DEMOLITION EXTERIOR ELEVATIONS	04/08/24	7	11/01/24
A1-11	SITE PLAN	04/08/24	9	5/12/25
A2-01	SLAB PLAN	04/08/24	7	11/01/24
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A2-21	ENLARGED RESTROOM PLANS & ELEVATION	04/08/24		
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A2-23	ENLARGED WARMING KITCHEN PLANS & ELEVATIONS	07/23/24	5	07/25/24
A2-31	FLOOR FINISH PLAN	04/08/24	1	XX/XX/XX
A3-11	REFLECTED CEILING PLAN	04/08/24	7	11/01/24
A3-12	RCP DIMENSION PLAN	04/08/24	7	11/01/24
A4-11	ROOF PLAN	04/08/24		
A5-11	EXTERIOR ELEVATIONS	04/08/24	1	XX/XX/XX
A5-21	AXONOMETRIC VIEWS	04/08/24		
A6-11	BUILDING SECTIONS	04/08/24	5	07/25/24
A6-12	BUILDING SECTIONS	04/08/24		
A6-13	BUILDING SECTIONS	04/08/24		
A6-14	WALL SECTIONS	04/08/24	5	07/25/24
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A7-11	DOOR SCHEDULE	04/08/24	6	08/02/24
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A7-31	FINISH, EQUIPMENT, AND FINISH SCHEDULE	04/08/24	8	03/31/25
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A8-11	INTERIOR ELEVATIONS - GYM	04/08/24		
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A9-01	DETAILS - INTERIOR	04/08/24	5	07/25/24
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A9-21	DETAILS - EXTERIOR - FIBER CEMENT PANELS	04/08/24		
A9-25	DETAILS - EXTERIOR	04/08/24		
A9-30	DETAILS - DOOR	04/08/24		
A9-35	DETAILS - STOREFRONT	04/08/24		
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A9-40	DETAILS - ROOF	04/08/24	6	08/02/24
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03 STRUCTURAL

SHEET #	SHEET NAME	SHEET ISSUE DATE	CURRENT REVISION	CURRENT REVISION DATE
S0-00	GENERAL NOTES	04/08/24		
S0-01	GENERAL NOTES	04/08/24		
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S2-01	FOUNDATION DETAILS	04/08/24		
S3-00	FRAMING DETAILS	04/08/24		
S3-01	FRAMING DETAILS	04/08/24		
S4-00	STEEL DETAILS	04/08/24		
S4-01	STEEL DETAILS	04/08/24		
11				

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BID SET 06.03.25

X REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

SHEET INDEX SYMBOLS & ABBREVIATIONS

SHEET
G0-01

6/26/2025 4:39:04 PM

BUILDING CODE ANALYSIS

REFERENCES IN PARENTHESES () ARE KEYED TO THE CBC: SEE SHEET **G000** FOR CODE REFERENCES

PROJECT COMMUNITY CENTER RENOVATION
LAKEWOOD, CA

OCCUPANCY CLASSIFICATION (SECTION 302)

DESCRIPTION:	TYPE:	CODE SECTION:	REMARKS:
ENTRY LOBBY, MAIN HALL, MULTI-PURPOSE ROOMS, ASSOCIATED STORAGE, RESTROOMS, AND SERVICE SPACES	A-3	303.4	WHERE OCCUPANCY ≥ 50
OPEN OFFICE, CONFERENCE ROOM, OFFICE	B, ACCESSORY	304.1	ACCESSORY USE

TYPE OF CONSTRUCTION (TABLE 601)

DESCRIPTION:	TYPE:	FIRE SPRINKLERS:	CODE SECTION:
1 STORY WOOD FRAME STRUCTURE ABOVE GRADE WITH WOOD STUD FRAMING			
COMMUNITY CENTER	VB	YES (NFPA 13)	602.5, 903.1

ALLOWABLE HEIGHT (TABLE 504.3 & 504.4)

MAXIMUM STORIES FOR TYPE VB CONSTRUCTION:	2 (ABOVE GRADE PLANE; PER TABLE 504.4)
MAXIMUM HEIGHT FOR TYPE VB CONSTRUCTION:	60' (ABOVE GRADE PLANE; PER TABLE 504.3)

ACTUAL HEIGHT (SECTION 504)

STORIES:	1 (COMPLIES)
HEIGHT:	29'-3" TO AVERAGE OF HIGHEST ROOF SURFACE < 60' (COMPLIES)

ALLOWABLE BUILDING AREA (SECTION 506 & TABLE 506.2)

ALLOWABLE AREA: 24,000 SF
EXISTING: 13,300 SF
ADDITION (THIS APPLICATION): 1,360 SF
TOTAL AREA: **14,660 (COMPLIES)**

CONSTRUCTION NOTES

HORIZONTAL BUILDING SEPARATION (SECTION 510.2)

N/A

MIXED OCCUPANCY BUILDING SECTION 508

A-3	COMMUNITY HALLS
B	OFFICE AREAS - CIVIC ADMINISTRATION

NON-SEPARATED OCCUPANCIES PER 508.3; BUILDING HEIGHT, AREA, AND NUMBER OF STORIES COMPLIES WITH MOST RESTRICTIVE USE A-3

PER SECTION 311.1.1. STORAGE AREAS THAT ARE ACCESSORY TO ANOTHER OCCUPANCY ARE CLASSIFIED AS PART OF THAT OCCUPANCY

FIRE-RESISTANCE RATINGS (TABLE 601, 602, & SECTION 510.2)

	TYPE VB:
STRUCTURAL FRAME	0-HR
BEARING WALLS: EXTERIOR	0-HR
BEARING WALLS: INTERIOR	0-HR
NON-BEARING WALLS & PARTITION: EXTERIOR	
X < 5' FIRE SEPARATION	1-HR
5' ≤ X < 10' FIRE SEPARATION	1-HR
10' ≤ X < 30' FIRE SEPARATION	0-HR
X ≥ 30' FIRE SEPARATION	0-HR (ALL SIDES OF BUILDING HAVE > 30' SEPARATION)
NON-BEARING WALLS & PARTITIONS: INTERIOR	0-HR
FLOOR CONSTRUCTION (INCL. BEAMS & JOISTS)	0-HR
ROOF CONSTRUCTION (INCL. BEAMS & JOISTS)	0-HR

NOTE: RATING / CONSTRUCTION TYPE FOR PARAPET TO MATCH EXTERIOR WALL REQUIREMENTS

FIRE-RESISTANCE RATING OF STRUCTURAL MEMBERS SECTION

MAXIMUM AREA OF UNPROTECTED EXT. WALL OPENINGS (TABLE 705.8, SECTION 705.8.1 & 705.8.2)

X < 3' FIRE SEPARATION DISTANCE	NOT PERMITTED
3' ≤ X < 5'	15%
5' ≤ X < 10'	25%
10' ≤ X < 15'	45%
15' ≤ X < 20'	75%
20' ≤ X < 25'	NO LIMIT ALL SIDES OF BUILDING HAVE > 30' SEPARATION

N/A

FIRE BLOCKING (SECTION 718.2)

VERTICALLY AT CEILING AND FLOOR LEVEL
HORIZONTALLY AT INTERVALS NOT EXCEEDING 10 FEET

DRAFTSTOPPING (SECTION 718.3 & 718.4)

HORIZONTAL AREAS ARE NOT TO EXCEED 3,000 SF

FIRE WALL (SECTION 706, EXCEPTIONS 706.5.3 AND 706.6.4)

N/A

PENETRATIONS (SECTION 714)

DESCRIPTION:	TEST SYSTEM:	CODE SECTION:
THROUGH PENETRATIONS	APPROVED MATERIAL OR ASTM E 814 OR UL 1479	714.3.1.2, 714.4.1.1.2
MEMBRANE PENETRATIONS	APPROVED MATERIAL OR ASTM E 814 OR UL 1479	714.3.2, 714.4.1.2

OPENING PROTECTIVES (TABLE 716.5 & 716.6)

DESCRIPTION:	WALL ASSEMBLY RATING:	OPENING FIRE RATING:	REMARKS:
EXIT ENCLOSURE	2-HR	1-1/2-HR	ELEVATOR, STAIRWELLS, NFPA 252 OR UL 10C
SHAFTS	2-HR	1-1/2-HR	TRASH CHUTES, NFPA 252 OR UL 10C
OTHER FIRE BARRIERS	1-HR	3/4-HR	OCCUPANCY SEPARATION WALL, NFPA 252 OR UL 10C
FIRE PARTITIONS	1-HR	1/3-HR	DOORS IN CORRIDOR WALLS, NFPA 252 OR UL 10C
FIRE PARTITIONS	1-HR	1/3-HR	WINDOWS IN CORRIDOR WALLS, ASTM 119 OR UL 263

DUCT OPENING (SECTION 717)

DESCRIPTION:	TESTED SYSTEM:	CODE SECTION:
FIRE DAMPERS	UL 555 AND/OR UL 555S	7.7.3.1
PENETRATION FIRESTOP	ASTM E 814 OR UL 1479	714.3.1.2

MEANS OF EGRESS

OCCUPANT LOADS (TABLE 1004.1.2)

LOBBIES (BUSINESS AREA) / OFFICES	150 GROSS SF/OCCUPANT
ACCESSORY STORAGE & MECHANICAL	300 GROSS SF/OCCUPANT
CLUB / COMMUNITY / MEETING ROOMS	15 NET SF/OCCUPANT - UNCONCENTRATED (TABLES AND CHAIRS) 7 NET SF/OCCUPANT - CONCENTRATED (CHAIRS ONLY - NOT FIXED)
GYMNASTICS	50 GROSS SF/OCCUPANT - EXERCISE ROOMS

MULTIPLE OCCUPANCIES (SECTION 1004.3, 1004.4)

THE OCCUPANT LOAD FOR AN AREA WITH MULTIPLE FUNCTIONS SHALL BE CALCULATED PER THE FLOOR AREA OF EACH FUNCTION. A BUILDING WITH MULTIPLE OCCUPANCIES SHALL HAVE MEANS OF EGRESS REQUIREMENTS APPLY TO EACH PORTION OF THE BUILDING BASED ON THE OCCUPANCY. WHEREAS MULTIPLE OCCUPANCIES THAT UTILIZE THE SAME MEANS OF EGRESS, THE MOST STRINGENT REQUIREMENTS SHALL APPLY. (1004.3, 1004.4)

MEANS OF EGRESS ILLUMINATION (SECTION 1008)

THE POWER SUPPLY FOR MEANS OF EGRESS ILLUMINATION SHALL BE PROVIDED BY THE PREMISE'S ELECTRICAL SUPPLY. IN THE EVENT OF POWER SUPPLY FAILURE, ILLUMINATION SHALL BE AUTOMATICALLY PROVIDED FROM AN EMERGENCY SYSTEM FOR THE FOLLOWING AREAS: (1008.3)
a. AISLES AND UNENCLOSED EGRESS STAIRWAYS IN ROOMS AND SPACES THAT REQUIRE TWO OR MORE MEANS OF EGRESS.
b. CORRIDORS, INTERIOR EXIT STAIRWAYS AND RAMPS, AND EXIT PASSAGEWAYS IN BUILDINGS REQUIRED TO HAVE TWO OR MORE EXITS.
c. EXTERIOR EGRESS COMPONENTS AT OTHER THAN THE LEVEL OF EXIT DISCHARGE UNTIL EXIT DISCHARGE IS ACCOMPLISHED FOR BUILDINGS REQUIRED TO HAVE TWO OR MORE EXITS.
d. INTERIOR EXIT DISCHARGE ELEMENTS, AS PERMITTED IN SECTION 1028.1, IN BUILDINGS REQUIRED TO HAVE TWO OR MORE EXITS.
e. EXTERIOR LANDINGS, AS REQUIRED BY SECTION 1010.1.6, FOR EXIT DISCHARGE DOORWAYS IN BUILDINGS REQUIRED TO HAVE TWO OR MORE EXITS.

THE MEANS OF EGRESS ILLUMINATION LEVEL SHALL BE NOT LESS THAN 1 FOOTCANDLE AT THE WALKING SURFACE. ALONG EXIT ACCESS STAIRWAYS, EXIT STAIRWAYS AND AT THEIR REQUIRED LANDINGS, THE ILLUMINATION LEVEL SHALL BE NOT LESS THAN 10 FOOTCANDLES AT THE WALKING SURFACE WHEN THE STAIRWAY IS IN USE AS REQUIRED BY BUILDING CODE 1008.2.1.

IN THE EVENT OF POWER SUPPLY FAILURE IN ROOMS, SPACES AND BUILDINGS THAT REQUIRE TWO OR MORE MEANS OF EGRESS, AN EMERGENCY ELECTRICAL SYSTEM FOR A DURATION OF NOT LESS THAN 90 MINUTES IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN BUILDING CODE 1008.3.

EXIT SIGNS SHALL BE ILLUMINATED AT ALL TIMES. TO ENSURE CONTINUED ILLUMINATION FOR A DURATION OF NOT LESS 90 MINUTES IN CASE OF PRIMARY POWER LOSS, THE SIGN ILLUMINATION MEANS SHALL BE CONNECTED TO AN EMERGENCY POWER SYSTEM PROVIDED FROM STORAGE BATTERIES, UNIT EQUIPMENT OR AN ON-SITE GENERATOR. 7

ACCESSIBLE MEANS OF EGRESS (SECTION 1006 & 1009)

2 REQUIRED PER 1009.1 AND 1006

DOORS (SECTION 1010)

DOOR WIDTH: 32 INCHES MINIMUM CLEAR WIDTH (1010.1.1)

EGRESS DOORS SHALL BE READILY OPENABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT IN ACCORDANCE WITH BUILDING CODE 1010.1.19. 7

PLANS MUST INDICATE / DETAIL THE FLOOR OR LANDING ON EACH SIDE OF DOORS IS NOT MORE THAN 1/2-IN. LOWER THAN THE THRESHOLD OF THE DOORWAY. RAISED THRESHOLDS AND FLOOR LEVEL CHANGES GREATER THAN 1/4-IN. AT DOORWAYS SHALL BE BEVELED WITH A SLOPE NOT GREATER THAN ONE UNIT VERTICAL IN TWO UNITS HORIZONTAL (50% SLOPE). (1010.1.6)

LANDINGS SHALL BE PROVIDED ON EACH SIDE OF DOORS AND SUCH LANDING SHALL BE AT THE SAME ELEVATION ON EACH SIDE OF THE DOOR. LANDINGS SHALL HAVE A WIDTH NOT LESS THAN THE WIDTH OF THE DOOR AND A LENGTH MEASURED IN THE DIRECTION OF TRAVEL OF NOT LESS THAN 44-IN. (1010.1.5, 1010.1.6)

DOORS SHALL NOT PROJECT MORE THAN 7-IN. INTO THE REQUIRED LANDING DIMENSIONS WHEN FULLY OPENED, OR MORE THAN ONE HALF INTO THE REQUIRED LANDING WIDTH WHEN OPEN IN ANY POSITION IF THE LANDING SERVES 50 OR MORE OCCUPANTS. PROVIDE DETAILS SHOWING COMPLIANCE. (1010.1.6)

SHOULD PANIC AND FIRE EXIT HARDWARE BE INSTALLED, THE FOLLOWING REQUIREMENTS SHALL BE SATISFIED:
A. PANIC HARDWARE IS LISTED IN ACCORDANCE WITH UL 305.
B. FIRE EXIT HARDWARE IS LISTED IN ACCORDANCE WITH UL 10C AND UL 305.
C. THE ACTUATING PORTION OF THE RELEASING DEVICE SHALL EXTEND AT LEAST ONE-HALF OF THE DOOR LEAF WIDTH.
D. THE MAXIMUM UNLATCHING FORCE DOES NOT EXCEED 5-POUNDS.
E. PIVOTED OR BALANCED DOORS SHALL BE OF THE PUSH-PAD TYPE WHERE PANIC HARDWARE IS REQUIRED, AND THE PAD SHALL NOT EXTEND ACROSS MORE THAN ONE-HALF OF THE DOOR WIDTH, MEASURED FROM THE LATCH SIDE. (1010.2.9.3)

RAMPS (SECTION 1012, 1114A,1122A, & 11B-405)

MIN. WIDTH	48"
MAX. SLOPE AT EGRESS	8%
MAX. SLOPE AT OTHER AREAS	12%
MAX. CROSS-SLOPE	2%
MAX. RISE W/OUT LANDING	30"
LANDING SIZE	60"
HANDRAILS REQUIRED	GREATER THAN 6" RISE

EXIT SIGNS (SECTION 1013)

REQUIRED AT EXITS, EXIT ACCESS DOORS, AND AT PATH OF EGRESS TRAVEL
NOT REQUIRED IN ROOMS WITH ONE EXIT
TACTILE EXIT SIGN REQUIRED AT EXIT STAIRWAY, EXIT PASSAGEWAY, AND EXIT DISCHARGE

THE PATH OF EGRESS TRAVEL TO EXITS AND WITHIN EXITS IN THIS BUILDING SHALL BE IDENTIFIED BY EXIT SIGNS CONFORMING TO THE REQUIREMENTS OF SECTION 1013 AND AS NOTED BELOW: (1013.1)
a. EXIT SIGNS SHALL BE READILY VISIBLE FROM ANY DIRECTION OF EGRESS TRAVEL.
b. EXIT SIGNS SHALL BE LOCATED AS NECESSARY TO CLEARLY INDICATE THE DIRECTION OF EGRESS TRAVEL.
c. NO POINT SHALL BE MORE THAN 100-FT. OR THE LISTED VIEWING DISTANCE FOR THE SIGN, WHICHEVER IS LESS, FROM THE NEAREST VISIBLE EXIT SIGN.

EXIT SIGNS SHALL BE INTERNALLY OR EXTERNALLY ILLUMINATED. INTERNALLY ILLUMINATED EXIT SIGNS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH UL 924 AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND CHAPTER 27. EXTERNALLY ILLUMINATED EXITS SIGNS SHALL COMPLY WITH THE GRAPHICS AND POWER SOURCE REQUIREMENTS IN SECTIONS 1013.6.1 AND 1013.6.3, RESPECTIVELY. WHEN THE FACE OF AN EXIT SIGN IS ILLUMINATED FROM AN EXTERNAL SOURCE, IT SHALL HAVE AN INTENSITY OF NOT LESS THAN 5-FOOTCANDLES (54 IUX). (1013.6.2)

EXIT ACCESS (TABLE 1006.2.1: ONE MEANS OF EGRESS IF OCCUPANT LOAD LESS THAN 49)

COMMON PATH OF EGRESS TRAVEL (A-3)	75'

EXITS

ONE EXIT ALLOWED IN A OCCUPANCY WITH OCCUPANT LOAD 49 OR LESS	(TABLE 1006.2.1.1)
SEPARATION OF 1/3 LENGTH OF DIAGONAL BETWEEN EXITS	(SECTION 1007.1.1.2)

EXIT ACCESS TRAVEL DISTANCE (TABLE 1017.2)

OCCUPANCY:	DISTANCE:
A-3, B	250'

ACCESSIBILITY

COMMON USE FACILITIES SHALL BE ACCESSIBLE	(SECTION 1127A)
PUBLIC USE FACILITIES SHALL BE ACCESSIBLE PER ADA AND CBC CHAPTER 11B	
PARKING SHALL BE ACCESSIBLE PER 11B REQUIREMENTS	(SECTION 11B-208 & 11B-502)
PARKING REQUIREMENTS - NO CHANGE	(SECTION 11B-208)
A-3 COMMUNITY CENTER	36 TOTAL PARKING SPACES EXISTING
ACCESSIBLE SPACES	MIN. 2; PER TABLE 11B-208.2 (SECTION 11B-208.2.3.1)
• VAN ACCESSIBLE SPACES	• MIN. 1 OF ABOVE ACCESSIBLE SPACES PROVIDED TO BE VAN ACCESSIBLE (SECTION 11B-208.2.4)
TOTAL NUMBER ACCESSIBLE STALLS	ACCESSIBLE STALLS PROVIDED (SEE SHEET G1-10) • 1 STANDARD ACCESSIBLE STALLS • 1 VAN ACCESSIBLE STALL (COMPLIES)

2022 ENERGY STANDARDS SECTION

THE PERSON WITH OVERALL RESPONSIBILITY FOR CONSTRUCTION OR THE PERSON RESPONSIBLE FOR THE INSTALLATION OF REGULATED FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES SHALL POST, OR MAKE AVAILABLE WITH THE BUILDING PERMIT(S) ISSUED FOR THE BUILDING, THE REQUIRED INSTALLATION CERTIFICATE(S) FOR FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES REGULATED BY THE APPLIANCE EFFICIENCY REGULATIONS OR PART 6. SUCH INSTALLATION CERTIFICATE(S) SHALL BE MADE AVAILABLE TO THE ENFORCEMENT AGENCY FOR ALL APPROPRIATE INSPECTIONS. THESE CERTIFICATES SHALL: SEC. 10-103 (a,b)
1. IDENTIFY FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES REQUIRED TO VERIFY COMPLIANCE WITH THE APPLIANCE EFFICIENCY REGULATIONS AND PART 6.
2. INCLUDE A STATEMENT INDICATING THAT THE FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICE CONFORM TO THE APPLIANCE EFFICIENCY REGULATIONS AND PART 6 AND THE REQUIREMENTS FOR SUCH FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES GIVEN IN THE PLANS AND SPECIFICATIONS APPROVED BY THE LOCAL ENFORCEMENT AGENCY.
3. STATE THE NUMBER OF THE BUILDING PERMIT UNDER WHICH THE CONSTRUCTION OR INSTALLATION WAS PERFORMED.

THE BUILDER SHALL PROVIDE THE BUILDING OWNER OR THE PERSON(S) RESPONSIBLE FOR BUILDING MAINTENANCE (IN CASE OF MULTI-TENANT OR CENTRALLY OPERATED BUILDINGS) AT OCCUPANCY THE FOLLOWING: SEC. 10-103 (b) 2-4
1. OPERATING INFORMATION: THE APPROPRIATE CERTIFICATE(S) OF COMPLIANCE AND A LIST OF THE FEATURES, MATERIALS, COMPONENTS, AND MECHANICAL DEVICES INSTALLED IN THE BUILDING AND INSTRUCTIONS ON HOW TO OPERATE THEM EFFICIENTLY.
2. MAINTENANCE INFORMATION: REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY STATED AND INCORPORATED ON A READILY ACCESSIBLE LABEL. THE LABEL MAY BE LIMITED TO IDENTIFYING THE OPERATION AND MAINTENANCE MANUAL.
3. VENTILATION INFORMATION: A DESCRIPTION OF THE QUANTITIES OF OUTDOOR AND RECIRCULATED AIR THAT THE VENTILATION SYSTEMS ARE DESIGNED TO PROVIDE TO EACH AREA.

MANUFACTURED FENESTRATION AND EXTERIOR DOORS SHALL MEET ALL LISTED REQUIREMENTS IN SEC 10-111-(A) UNDER SECTION 110.6(A) OF PART 6. TEMPORARY LABELS FOR MANUFACTURED FENESTRATION SHALL HAVE A CLEARLY VISIBLE TEMPORARY LABEL AND SHALL COMPLY WITH LABELING REQUIREMENTS OF NFRC 700. NO OTHER VALUES FOR U-FACTOR, SHGC, VT AND AIR LEAKAGE ARE ALLOWED ON THE TEMPORARY LABEL ATTACHED TO THE MANUFACTURED FENESTRATION PRODUCT OR EXTERIOR DOOR. SEC. 10-111(a)1

RATED FENESTRATION SHALL HAVE A PERMANENT LABEL CONSISTENT WITH THEIR RATING AND CERTIFICATION THAT IS EITHER A STAND-ALONE LABEL, AN EXTENSION OR TAB OF AN EXISTING PERMANENT CERTIFICATION LABEL BEING USED BY THE MANUFACTURER/RESPONSIBLE PARTY, OR A SERIES OF MARKS OR ETCHINGS ON THE PRODUCT. SEC. 10-111(a)2

JOINTS, PENETRATIONS AND OTHER OPENINGS IN THE BUILDING ENVELOPE THAT ARE POTENTIAL SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHER STRIPPED, OR OTHERWISE SEALED TO LIMIT INFILTRATION AND EXFILTRATION. SEC. 110.7

ALL INSULATING MATERIAL SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME-SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF THE CBC. SEC. 110.8(C)

NON-CENTRALIZED ENERGY MANAGEMENT SYSTEMS SHALL HAVE SETBACK THERMOSTATS CAPABLE TO PROGRAM TEMPERATURE SETPOINTS FOR AT LEAST FOUR PERIODS WITHIN A 24-HR. PERIOD. SEC. 110.2 (C)

THE LESSER OF THE MINIMUM RATE OF OUTDOOR AIR REQUIRED BY SEC. 120.1 (C), OR THREE COMPLETE AIR CHANGES SHALL BE SUPPLIED TO THE ENTIRE BUILDING DURING THE ONE-HOUR PERIOD IMMEDIATELY BEFORE THE BUILDING IS NORMALLY OCCUPIED. SEC. 120.1 (D) 2

ALL MECHANICAL VENTILATION AND SPACE-CONDITIONING SYSTEMS SHALL BE DESIGNED WITH DUCTWORK, DAMPERS, AND CONTROLS WHICH ALLOWS OUTSIDE AIR RATES TO BE OPERATED AT THE LARGER OF (1) THE MINIMUM LEVELS SPECIFIED IN SECTION 120.1(C)3 OR (2) THE RATE REQUIRED FOR MAKE-UP OR EXHAUST SYSTEMS THAT ARE REQUIRED FOR AN EXEMPT OR COVERED PROCESS, FOR CONTROL OF ODORS, OR FOR THE REMOVAL OF CONTAMINANTS WITHIN THE SPACE. MEASURED OUTSIDE AIR RATES OF CONSTANT AND VARIABLE VOLUME MECHANICAL VENTILATION SYSTEMS SHALL BE WITHIN 10% OF OUTSIDE AIR RATE SHOWN ON TABLE 120.1-A. SEC. 120.1 (F)

THE THERMOSTATIC CONTROLS FOR HVAC SYSTEMS SHALL BE CAPABLE OF BEING SET LOCALLY OR REMOTELY BY TO CONTROL COMFORT HEATING DOWN TO 55 °F OR LOWER AND COOLING UP TO 85°F OR HIGHER. THE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A DEAD BAND RANGE OF AT LEAST 5°F WITHIN WHICH HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM. SEC. 120.2 (A) (B)

OUTDOOR AIR SUPPLY AND EXHAUST EQUIPMENT SHALL BE INSTALLED WITH DAMPERS THAT AUTOMATICALLY CLOSE UPON FAN SHUTDOWN. SEC. 120.2 (F)

AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS, INCLUDING, BUT NOT LIMITED TO, BUILDING CAVITIES, MECHANICAL CLOSETS, AIR-HANDLER BOXES AND SUPPORT PLATFORMS USED AS DUCTS OR PLENUMS, SHALL BE INSTALLED, SEALED AND INSULATED TO MEET THE REQUIREMENTS OF CHAPTER 6 CMC CODE AND ANSI/SMACNA -006-2006 HVAC DUCT CONSTRUCTION STANDARDS METAL AND FLEXIBLE. SUPPLY-AIR DUCTS CONVEYING HEATED OR COOLED AIR SHALL BE INSULATED TO A MINIMUM INSTALLED LEVEL OF R-4.2 (R-8 IN UNCONDITIONED SPACE), UNLESS DUCTS ARE IN CONDITIONED SPACE. SEC. 120.4 (A) SEC. 120.4 (A)

EACH SPACE-CONDITIONING SYSTEM SHALL BE INSTALLED WITH CONTROLS (1) CAPABLE OF AUTOMATICALLY SHUTTING OFF THE SYSTEM DURING PERIODS OF NON-USE AND SHALL HAVE (A) 4-HR TIMER OR; (B) OCCUPANCY SENSORS OR; (C) AUTO TIME SWITCH CONTROLS AND ACCESSIBLE MANUAL OVERRIDE FOR UP TO 4-HRS. (2) AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN SETBACK THERMOSTAT SETPOINTS FOR MECHANICAL HEATING AND COOLING. (3) MULTIPURPOSE, CLASSROOMS CONFERENCE, CONVENTION, AUDITORIUM AND MEETING CENTER ROOMS OF CERTAIN SIZE WHICH DO NOT HAVE PROCESSES OR OPERATIONS THAT GENERATE DUSTS, FUMES, VAPORS OR GASSES SHALL BE EQUIPPED WITH OCCUPANT SENSOR(S) TO ACCOMPLISH THE FOLLOWING DURING UNOCCUPIED PERIODS (A) AUTOMATICALLY SETUP THE OPERATING COOLING TEMPERATURE SET POINT BY 2°F OR MORE AND SETBACK THE OPERATING HEATING TEMPERATURE SET POINT BY 2°F OR MORE AND; (B) AUTOMATICALLY RESET THE MINIMUM REQUIRED VENTILATION RATE WITH AN OCCUPANT SENSOR VENTILATION CONTROL DEVICE ACCORDING TO SECTION 120.1(C)6. (4) HOTEL AND MOTEL GUEST ROOMS SHALL HAVE CAPTIVE CARD KEY CONTROLS, OCCUPANCY SENSING CONTROLS, OR AUTOMATIC CONTROLS SUCH THAT, NO LONGER THAN 30 MINUTES AFTER THE GUEST ROOM HAS BEEN VACATED, SETPOINTS ARE SETUP AT LEAST +5° F (+3°C) IN COOLING MODE AND SET-DOWN AT LEAST -5°F (-3°C) IN HEATING MODE. SEC. 120.2 (E) (1-4)

COUNTY OF LOS ANGELES BUILDING CODE SECTION

CONSTRUCTION IN THE PUBLIC RIGHT OF WAY AND PROJECTION BEYOND THE PROPERTY LINES OR INTO THE ALLEYS SHALL COMPLY CHAPTER 32

PEDESTRIANS SHALL BE PROTECTED DURING CONSTRUCTION, REMODELING AND DEMOLITION ACTIVITIES AS REQUIRED BY COUNTY OF LOS ANGELES BUILDING CODE CHAPTER 33

THE CONSTRUCTION SHALL NOT RESTRICT A FIVE-FOOT CLEAR AND UNOBSTRUCTED ACCESS TO ANY WATER OR POWER DISTRIBUTION FACILITIES (POWER POLES, PULL-BOXES, TRANSFORMERS, VAULTS, PUMPS, VALVES, METERS, APPURTENANCES, ETC.) OR TO LOCATION OF THE HOOK-UP. THE CONSTRUCTION SHALL NOT BE WITHIN TEN FEET OF ANY POWER LINES WHETHER, OR NOT, THE LINES ARE LOCATED ON THE PROPERTY. FAILURE TO COMPLY MAY CAUSE CONSTRUCTION DELAYS AND/OR ADDITIONAL EXPENSES.

PROVIDE ULTRA-LOW FLUSH WATER CLOSETS FOR ALL NEW CONSTRUCTION.

A COPY OF THE EVALUATION REPORT AND/OR EXISTING CONDITIONS SHALL BE MADE AVAILABLE AT THE JOB SITE.

FIRE - WATER AND ACCESS

APPROVED BUILDING ADDRESS NUMBERS, BUILDING NUMBERS OR APPROVED BUILDING IDENTIFICATION SHALL BE PROVIDED AND MAINTAINED SO AS TO BE PLAINLY VISIBLE AND LEGIBLE FROM THE STREET FRONTING THE PROPERTY. THE NUMBERS SHALL CONTRAST WITH THEIR BACKGROUND, BE ARABIC NUMERALS OR ALPHABET LETTERS, AND BE A MINIMUM OF 4 INCHES HIGH WITH A MINIMUM STROKE WIDTH OF 0.5 INCH. FIRE CODE 505.1 7

FIRE / LIFE SAFETY

PROVIDE AN APPROVED AUTOMATIC FIRE SPRINKLER SYSTEM IN ACCORDANCE WITH PROVISIOINS SET FORTH IN BUILDING CODE SECTION 903.3. REASON: SPRINKLER SYSTEM IS REQUIRED FOR A-3 IF THE FIRE AREA HAS AN OCCUPANT LOAD OF 300 OR MORE PER CFC 903.2.1.3. FIRE SPRINKLER PLANS SHALL BE SUBMITTED TO THE SPRINKLER PLAN CHECK UNIT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION IN ACCORDANCE WITH FIRE CODE 901.2

PORTABLE FIRE EXTINGUISHERS SHALL BE INSTALLED AND MAINTAINED IN ALL OCCUPANCY GROUPS AND AT SUCH LOCATIONS AS REQUIRED BY FIRE CODE 906 AND CALIFORNIA CODE OF REGULATIONS, TITLE 19, DIVISION 1, CHAPTER 3. THE FINAL NUMBER AND LOCATION OF ALL EXTINGUISHERS SHALL BE DETERMINED BY THE LOCAL AREA FIRE INSPECTOR.

PROVIDE AN APPROVED MANUAL FIRE OR AUTOMATIC SMOKE DETECTION SYSTEM IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN FIRE CODE 907.REASON: A MANUAL FIRE ALARM SYSTEM THAT ACTI VATES THE OCCUPANT NOTIFICATION SYSTEM IN ACCORDANCE WITH SECTION 907.5 SHALL BE INSTALLED IN GROUP A OCCUPANCIES WHERE THE OCCUPANT LOAD DUE TO THE ASSEMBLY OCCUPANCY IS 300 OR MORE, OR WHERE THE GROUP A OCCUPANT LOAD IS MORE THAN 100 PERSONS ABOVE OR BELOW THE LOWEST LEVEL OF EXIT DISCHARGE. FIRE ALARM AND SMOKE DETECTION PLANS SHALL BE SUBMITTED TO THE FIRE ALARM PLAN CHECK UNIT FOR REVIEW AND APPROVAL PRIOR TO INSTALLATION IN ACCORDANCE WITH FIRE CODE 901.2 7

FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED ON THE STREET-ADDRESS SIDE OF BUILDINGS, FACING APPROVED FIRE APPARATUS ACCESS ROADS, WITHIN 150 FEET (VIA VEHICULAR ACCESS) OF AN ACCESSIBLE PUBLIC FIRE HYDRANT, AND AS CLOSE TO THE STREET CURB FACE AS POSSIBLE, FULLY VISIBLE, AND RECOGNIZABLE FROM THE STREET. FIRE APPARATUS ACCESS ROAD OR NEAREST POINT OF FIRE DEPARTMENT VEHICLE ACCESS OR AS OTHERWISE APPROVED BY THE FIRE CODE OFFICIAL. FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED A MINIMUM OF 25 FEET (7,620 MM) FROM THE STRUCTURE. WHEN THIS DISTANCE CANNOT BE ACHIEVED, A MINIMUM TWO-HOUR, FIRE-RESISTIVE WALL SHALL BE PROVIDED FOR THE STRUCTURE WITH NO OPENINGS IN THE WALL FOR 25 FEET (7,620 MM) IN EITHER DIRECTION FROM THE FIRE DEPARTMENT CONNECTION. THE REQUIRED FIRE-RESISTIVE CONSTRUCTION AND LACK OF OPENINGS SHALL EXTEND FOR THE FULL HEIGHT OF THE WALL OR BUILDING AS DETERMINED BY THE FIRE CODE OFFICIAL. THE FIRE CODE OFFICIAL MAY ALLOW SUFFICIENTLY PROTECTED OVERHEAD OPENINGS. FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED NOT LESS THAN 24 INCHES (609.6 MM) NOR MORE THAN 42 INCHES (1,066.8 MM) ABOVE GRADE. FIRE CODE 912.2.1

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CODE ANALYSIS

SHEET
G0-02

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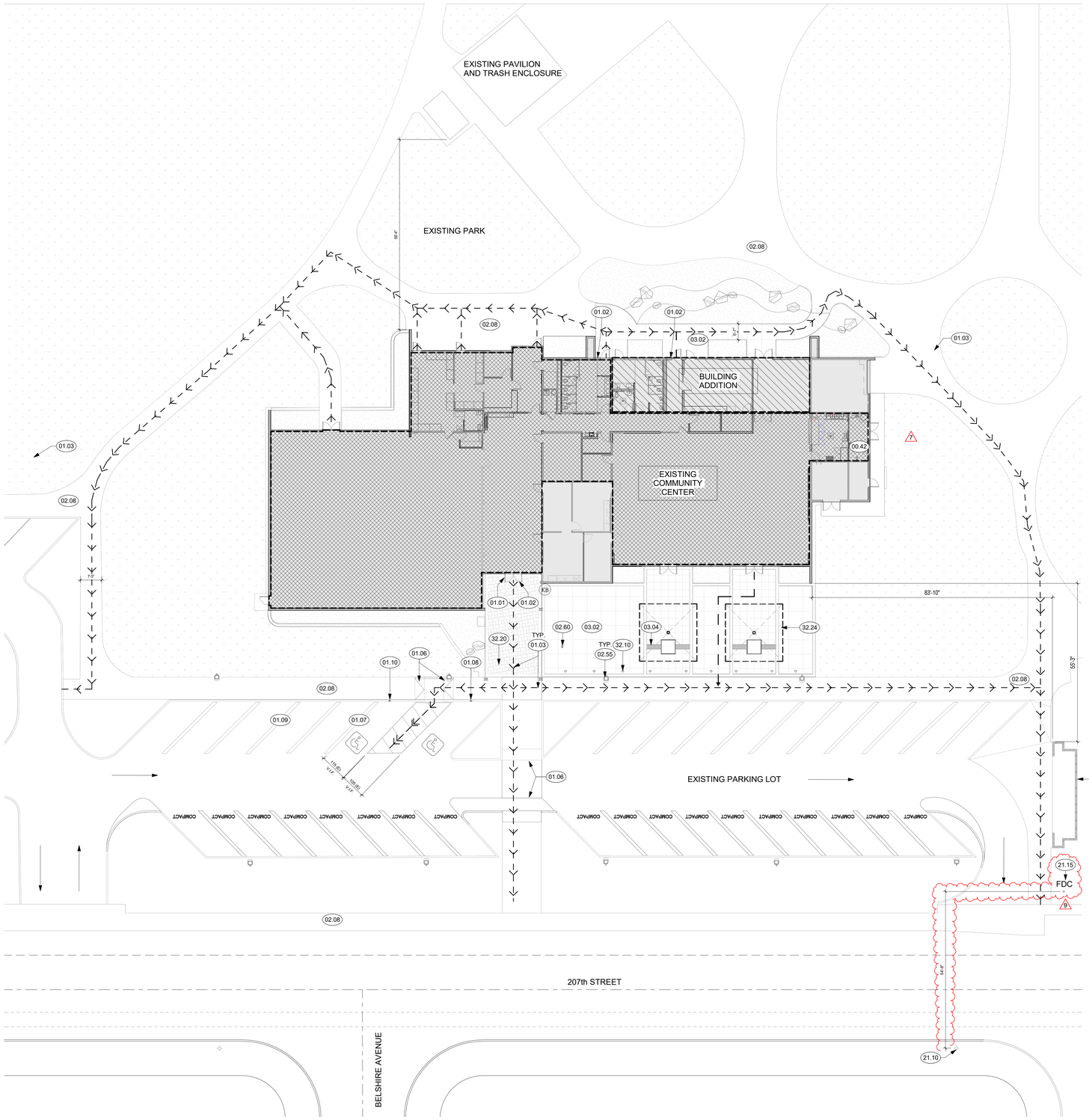

1 CODE COMPLIANCE SITE PLAN
1/16" = 1'-0"

CODE ANALYSIS NOTES

1. CODE ANALYSIS BASED ON CODE REFERENCES INDICATED ON SHEET G0-02.
2. SEE SHEET G1-41 AND G1-42 FOR ACCESSIBILITY INFORMATION.
3. WALLS SHALL BE RATED IN ACCORDANCE WITH CBC 601 AND 602. SEE BUILDING CODE ANALYSIS ON G0-02
4. PROVIDE FIRE-BLOCKING IN CONCEALED SPACES AS REQUIRED PER CBC SEC 718.2
5. PROVIDE CARBON MONOXIDE ALARMS (CBC SEC. 915), S.E.D.
6. FOR DIRECTIONAL ILLUMINATED EXIT SIGNAGE, PER CBC 1008, S.E.D.
7.
8. ACCESSIBLE PATH OF EGRESS SHALL BE 44" MIN. CLEAR WIDTH THROUGHOUT BUILDING. (36" MIN. IN UNITS AND OTHER AREAS < 10 OCCUPANTS) CBC TABLE 1020.2.
9. EXIT DOOR SHALL BE OPERABLE FROM INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT AND ONLY REQUIRE SINGLE ACTION (1010.1.9 CFC & CBC).
10. SEE G3 SERIES SHEETS FOR WALL PARTITIONS

SITE - CODE ANALYSIS LEGEND

- EXTERIOR ACCESSIBLE ROUTE FROM ACCESSIBLE BUILDING ENTRANCES (CBC 118-206) AND TO PUBLIC RIGHT OF WAY (CBC 1028). 5% MAX SLOPE FOR WALKWAY AND 2% FOR CROSS SLOPE; AND RAMP/HANDRAIL ARE REQUIRED WHEN SLOPE IS MORE THAN 5% AND 8.3%. A STAIR/HANDRAIL ARE REQUIRED WHEN SLOPE IS GREATED THATN 8.3%
- PROPERTY LINE
- EXISTING COMMUNITY BUILDING
- BUILDING ADDITION
- AREA OF INTERIOR WORK, SEE SHEET A2-11
- EXISTING TURF
- LANDSCAPE PLANTERS
- KB — REMOVE AND REINTSTALL EXISTING KNOX BOX UNIT. KNOX BOX UNIT SHALL BE LOCATED ON THE EXTERIOR, RIGHT SIDE OF THE DOOR, BETWEEN FIVE AND SIX FEET ABOVE GROUND. PROVIDE MASTER KEYS AND ACCESS CONTROL CARDS TO OBTAIN ACCESS TO ALL AREAS WITHIN THE BUILDING. IN ADDITION, PROVIDE KEYS NECESSARY TO OPERATE FIRE ALARM CONTROL PANELS, ANNUNCIATORS, RESET OF ALARM DEVICES LOCKS FOR SPRINKLER CONTROL VALVES, PIV, BACK FLOW, ETC. CONTACT THE FIRE DISTRICT FOR APPLICATION AND PURCHASE. AN APPROVED KEY BOX, LISTED IN ACCORDANCE WITH UL 1037 SHALL BE PROVIDED AS REQUIRED BY FIRE CODE 506. THE LOCATION OF EACH KEY BOX SHALL BE DETERMINED BY THE FIRE INSPECTOR.
- FDC — FIRE DEPARTMENT CONNECTION, FINAL LOCATION TBD BY SPRINKLER UNIT

KEYNOTE LEGEND

00.42	FIRE RISER ROOM
01.01	ACCESSIBLE DOORS AND HARDWARE WITH AUTOMATIC DOOR OPENER PUSH BUTTON.
01.02	PROVIDE INTERNATIONAL SYMBOL OF ACCESSIBILITY AT MAIN ENTRY DOOR. SEE 8 AND 9/G1-42
01.03	ACCESSIBLE PATH OF TRAVEL; SEE NOTES 2-4/G1-41
01.06	(E) ACCESSIBLE CURB RAMP WITH TRUNCATED DOMES. ACCESSIBILITY UPGRADES PER BUILDING PERMIT BL 0401 1503300068.
01.07	(E) STANDARD ACCESSIBLE PARKING STALL. ACCESSIBILITY UPGRADES PER BUILDING PERMIT BL 0401 1503300068.
01.08	(E) ACCESSIBLE STANDARD PARKING SIGNAGE. ACCESSIBILITY UPGRADES PER BUILDING PERMIT BL 0401 1503300068.
01.09	(E) VAN ACCESSIBLE PARKING STALL. ACCESSIBILITY UPGRADES PER BUILDING PERMIT BL 0401 1503300068.
01.10	(E) VAN ACCESSIBLE PARKING SIGNAGE. ACCESSIBILITY UPGRADES PER BUILDING PERMIT BL 0401 1503300068.
02.08	PROTECT IN PLACE (E) CONCRETE PAVING TO REMAIN
02.55	PROTECT IN PLACE (E) POLE SITE LIGHTING TO REMAIN
02.60	PROTECT IN PLACE (E) FLAGPOLE TO REMAIN
03.02	CONCRETE HARDSCAPE, S.C.D. AND S.L.D.
03.04	CAST IN PLACE CONCRETE BENCH, S.L.D.
21.10	EXISTING FIRE HYDRANT
21.15	STANDALONE FIRE DEPARTMENT CONNECTION, FINAL LOCATION SHALL BE DETERMINED BY SPINKLER UNIT
32.10	ILLUMINATED CRASH BOLLARD, S.E.D.
32.20	BRICK PAVERS, S.L.D.
32.24	20' SQUARE CENTER POST UMBRELLA WITH FIXED MOUNTING PLATE, S.C.D.

1 4 8 16 32
SCALE: 1/16" = 1'-0"

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CODE COMPLIANCE SITE PLAN

SHEET
G1-10

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ROOM - OCCUPANCY CALCULATION

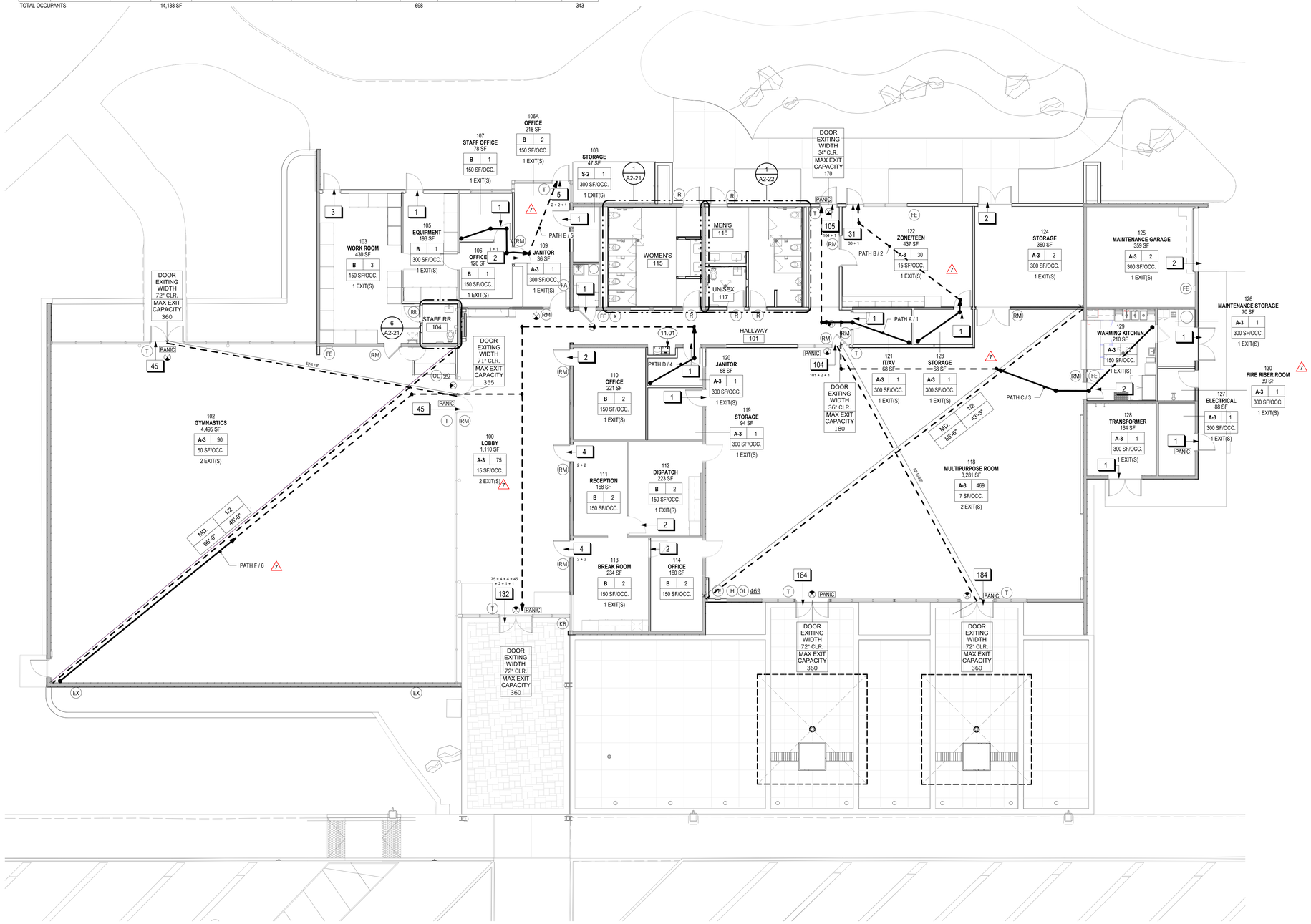
RM #	RM NAME	OCCUPANCY (CH 3)	AREA	EXITING CALCULATIONS			PLUMBING OCCUPANCY CALCULATIONS		
				EXITING OCCUPANCY LOAD	LOAD FACTOR	LOAD	PLUMBING OCCUPANCY	LOAD FACTOR	LOAD
100	LOBBY	A-3	1,110 SF	ASSEMBLY - UNCONCENTRATED (TABLES AND CHAIRS)	15	75	GROUP A3	30	38
101	HALLWAY	-	432 SF	N/A			(none)		
102	GYMNASTICS	A-3	4,495 SF	EXERCISE ROOMS	50	90	GROUP A2	30	150
103	WORK ROOM	B	430 SF	BUSINESS AREAS	150	3	GROUP B	200	3
104	STAFF RR	-	46 SF	N/A			(none)		
105	EQUIPMENT	B	193 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	1	GROUP S	5000	1
106	OFFICE	B	128 SF	BUSINESS AREAS	150	1	GROUP B	200	1
106A	OFFICE	B	218 SF	BUSINESS AREAS	150	2	GROUP B	200	2
107	STAFF OFFICE	B	78 SF	BUSINESS AREAS	150	1	GROUP B	200	1
108	STORAGE	S-2	47 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	1	GROUP S	5000	1
109	JANITOR	A-3	36 SF	ACCESSORY STORGE AREAS, MECHANICAL EQUIPMENT ROOM	300	1	GROUP S	5000	1
110	OFFICE	B	221 SF	BUSINESS AREAS	150	2	GROUP B	200	2
111	RECEPTION	B	168 SF	BUSINESS AREAS	150	2	GROUP B	200	1
112	DISPATCH	B	223 SF	BUSINESS AREAS	150	2	GROUP B	200	2
113	BREAK ROOM	B	234 SF	BUSINESS AREAS	150	2	GROUP B	200	2
114	OFFICE	B	160 SF	BUSINESS AREAS	150	2	GROUP B	200	1
115	WOMEN'S	-	309 SF	N/A			(none)		
116	MEN'S	-	257 SF	N/A			(none)		
117	UNISEX	-	55 SF	N/A			(none)		
118	MULTIPURPOSE ROOM	A-3	3,281 SF	ASSEMBLY - CONCENTRATED (CHAIRS ONLY)	7	469	GROUP A2	30	110
119	STORAGE	A-3	94 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	1	GROUP S	5000	1
120	JANITOR	A-3	58 SF	ACCESSORY STORGE AREAS, MECHANICAL EQUIPMENT ROOM	300	1	GROUP S	5000	1
121	IT/AV	A-3	68 SF	ACCESSORY STORGE AREAS, MECHANICAL EQUIPMENT ROOM	300	1	GROUP S	5000	1
122	ZONE/TEEN	A-3	437 SF	ASSEMBLY - UNCONCENTRATED (TABLES AND CHAIRS)	15	30	GROUP A3	30	15
123	STORAGE	A-3	68 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	1	GROUP S	5000	1
124	STORAGE	A-3	360 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	2	GROUP S	5000	1
125	MAINTENANCE GARAGE	A-3	359 SF	ACCESSORY STORGE AREAS, MECHANICAL EQUIPMENT ROOM	300	2	GROUP S	5000	1
126	MAINTENANCE STORAGE	A-3	70 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	1	GROUP S	5000	1
127	ELECTRICAL	A-3	88 SF	ACCESSORY STORGE AREAS, MECHANICAL EQUIPMENT ROOM	300	1	GROUP S	5000	1
128	TRANSFORMER	A-3	164 SF	ACCESSORY STORGE AREAS, MECHANICAL EQUIPMENT ROOM	300	1	GROUP S	5000	1
129	WARMING KITCHEN	A-3	210 SF	BUSINESS AREAS	150	2	GROUP B	200	2
130	FIRE RISER ROOM	A-3	39 SF	MERCANTILE - STORAGE, STOCK, SHIPPING AREAS	300	1	GROUP S	5000	1
TOTAL OCCUPANTS			14,138 SF			698			343

PLUMBING FACILITIES CALCULATION - (CPC TABLE 422.1) A-3 OCC.

PLUMBING FIXTURE	REQUIRED			PROVIDED				
	MEN	WOMEN	TOTAL	MEN	WOMEN	UNISEX	TOTAL	
OCCUPANTS	171	171	342	-	-	-	-	
WATER CLOSETS	2	4	6	3	5	2	10	COMPLIES
URINALS	2	-	2	2	-	-	2	COMPLIES
LAVATORIES	1	2	3	2	2	2	6	COMPLIES
DRINKING FOUNTAINS	-	-	2	-	-	2	2	COMPLIES

EXIT ACCESS TRAVEL DISTANCE MAXIMUM - 250'	
PATH NAME	Length
PATH A	37'-7"
PATH B	38'-2"
PATH C	95'-3"
PATH D	97'-11"
PATH E	31'-1"
PATH F	142'-2"

COMMON PATH OF EGRESS TRAVEL MAXIMUM - 75'	
Mark	Length
PATH 1	16'-7"
PATH 2	11'-6"
PATH 3	33'-11"
PATH 4	14'-11"
PATH 5	17'-0"
PATH 6	41'-3"



1 EXITING AND OCCUPANCY PLAN
1/8" = 1'-0"

CODE ANALYSIS NOTES

1. CODE ANALYSIS BASED ON CODE REFERENCES INDICATED ON SHEET G0-02.
2. SEE SHEET G1-41 AND G1-42 FOR ACCESSIBILITY INFORMATION.
3. WALLS SHALL BE RATED IN ACCORDANCE WITH CBC 601 AND 602. SEE BUILDING CODE ANALYSIS ON G0-02
4. PROVIDE FIRE-BLOCKING IN CONCEALED SPACES AS REQUIRED PER CBC SEC 718.2
5. PROVIDE CARBON MONOXIDE ALARMS (CBC SEC. 915), S.E.D.
6. FOR DIRECTIONAL ILLUMINATED EXIT SIGNAGE, PER CBC 1008, S.E.D.
7.
8. ACCESSIBLE PATH OF EGRESS SHALL BE 44" MIN. CLEAR WIDTH THROUGHOUT BUILDING. (36" MIN. IN UNITS AND OTHER AREAS < 10 OCCUPANTS) CBC TABLE 1020.2.
9. EXIT DOOR SHALL BE OPERABLE FROM INSIDE WITHOUT THE USE OF A KEY OR ANY SPECIAL KNOWLEDGE OR EFFORT AND ONLY REQUIRE SINGLE ACTION (1010.1.9 CFC & CBC).
10. SEE G3 SERIES SHEETS FOR WALL PARTITIONS

CODE ANALYSIS LEGEND

- EXIT SIGN, S.E.D.
- FE — PROVIDE SEMI RECESSED FIRE EXTINGUISHER CABINET AND EXTINGUISHER (2A:10B:C) SEE 10/A9-03. EXTINGUISHERS SHALL BE MOUNTED ON THE WALL OR IN CABINETS, SUCH THAT THE TOP OF THE EXTINGUISHER IS NO MORE THAN FOUR(4) FEET ABOVE FLOOR LEVEL. EXTINGUISHER SHALL BE COMMERCIAL GRADE, CURRENTLY TAGGED, OR HAVE MANUFACTURER DATE CLEARLY MARKED ON THE EXTINGUISHER.
- OCCUPANCY EXITING LOAD (ARROW INDICATES DIRECTION OF TRAVEL).
- INTERIOR ACCESSIBLE PATH OF EGRESS. 10 OR MORE OCCUPANTS 44" MIN. WIDTH; LESS THAN 10 OCCUPANTS 36" MIN. WIDTH (CBC 1119A.3).
- MD. 107'-4" | 1/2 53'-8" — 1/2 OF THE MAXIMUM DIAGONAL DIMENSION PER CBC SEC. 1007.1.1
- ACTUAL DISTANCE BETWEEN EXITS PROVIDED.
- 100 ROOM 1,000 SF — ROOM NUMBER, ROOM NAME, SQUARE FOOTAGE
- B | 10 / 10 — ALLOWABLE SF PER OCCUPANT (PER CBC TABLE 1004.1.2); OCCUPANCY TYPE (PER CBC CH. 3)
- 1 EXIT(S) — OCCUPANT LOAD; NUMBER OF EXITS REQUIRED (PER CBC 1006.2.1)
- DOOR EXITING WIDTH 36" CLR. — CLEAR WIDTH AT DOOR
- MAX EXIT CAPACITY 180 — MAXIMUM CAPACITY OF THE EXIT = CLEAR WIDTH / 0.2 FACTOR
- R-2 — OCCUPANCY TYPE
- DISCHARGE PATH PER CBC 1028, SEE SHEET G1-10 FOR PATH TO PUBLIC RIGHT OF WAY
- COMMON PATH OF TRAVEL
- KB — KNOX BOX UNIT SHALL BE LOCATED ON THE EXTERIOR, RIGHT SIDE OF THE DOOR, BETWEEN FIVE AND SIX FEET ABOVE GROUND. PROVIDE MASTER KEYS AND ACCESS CONTROL CARDS TO OBTAIN ACCESS TO ALL AREAS WITHIN THE BUILDING. IN ADDITION, PROVIDE KEYS NECESSARY TO OPERATE FIRE ALARM CONTROL PANELS, ANNUNCIATORS, RESET OF ALARM DEVICES LOCKS FOR SPRINKLER CONTROL VALVES, PIV, BACK FLOW, ETC. CONTACT THE FIRE DISTRICT FOR APPLICATION AND PURCHASE. AN APPROVED KEY BOX, LISTED IN ACCORDANCE WITH UL 1037 SHALL BE PROVIDED AS REQUIRED BY FIRE CODE 506. THE LOCATION OF EACH KEY BOX SHALL BE DETERMINED BY THE FIRE INSPECTOR.
- ### OL — SIGN: "THIS ROOM'S MAXIMUM OCCUPANCY IS _____ PERSONS" PER CBC 1004.3, MOUNT AT 7'-0" (U.O.N) VERIFY LOCATION WITH ARCHITECT. # - NUMBER OF OCCUPANTS
- PANIC — DOOR TO BE EQUIPPED WITH PANIC HARDWARE - SEE PROJECT MANUAL AND HARDWARE SCHEDULE FOR MORE INFORMATION.
- EX — EXTERIOR BUILDING SIGNAGE, SEE ELEVATIONS FOR FURTHER INFORMATION
- R — RESTROOM SIGNAGE, SEE 9/G1-42
- RR — RESTROOM SIGNAGE, NOT ACCESSIBLE
- RM — ROOM NAME AND NUMBER SIGNAGE
- T — TACTILE EXIT SIGN
- X — EMERGENCY EXITING DIAGRAM IN CLEAR PLASTIC HOLDER (8 1/2" x 11" FORMAT).
- FA — FIRE ALARM CONTROL PANEL SIGNAGE PER CFC 509.1
- H — ASSISTED LISTENING SYSTEM SIGNAGE PER 11B-219

SCALE: 1/8" = 1'-0"

PROJECT NORTH

DAHLIN
505 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	Author
CHECK	Checker

CODE ANALYSIS, EXITING, AND SIGNAGE PLAN

SHEET G1-21

6/26/2025 4:39:19 PM

2.Entrances
(2022 CBC Section 11B-206.4)
A. Entrances doors, doorways, and gates shall comply with Section 11B-404 and shall be on an accessible route complying with Section 11B-402.
1. All Entrances and exterior ground floor exits to buildings and facilities shall comply Section 11B-404. (Many exceptions)

4. Walking Surfaces (Site)
(2022 CBC Section 11B-403 and See Curb Ramps)
A. Side walks width: 48" minimum. (11B-403.5.1 Ex. 3 & 11B-403.5.3) 60" in. if there is no passing spaces measuring 60" by 60" min. located at intervals of 200 ft. max. or, an intersection of two walking surfaces providing a T-shaped space complying with **(11B-304.3.2)** where the base and arms of the T-shape extends 48" min. beyond the intersection.
B. Maximum Slope: 1:20 (5%). Exceptions: The running slope of the sidewalks shall not exceed the general grade established for the adjacent street or highway **(11B-403.3)**.
C. Continuous gradient**(11B-403.7)**: All walks with continuous gradient (slopes), shall have resting areas 60" in length by the width of the walk, at intervals of 400 feet max. The cross slope of resting area in all directions shall be 1:48 (2%) max. Changes in level between 1/4" and 1/2" shall be beveled with slope of 1:2 max. **(11B-303.3).**
D. Changes in level greater than 1/2" high shall be ramped and shall comply with **(11B-405 - Ramps) or (11B-406 - Curb ramps, blended transitions and islands).**
E. Floor or ground surfaces: Shall be stable, firm, and slip resistant. **(11B-302.1)**
F. Cross slopes: 1 unit vertical in 48 units horizontal (2 percent slope) max. **(11B-305.2)**
G. Openings (gratings): Openings in the floor or ground shall not allow passage of a sphere more than 1/2" diameter. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.**(11B-302.3)**
H. Warning Curbs: Abrupt changes in level exceeding 4" high between walks, sidewalks or pedestrian ways and adjacent surfaces or features shall be identified by warning curbs at least 6" high above walk or sidewalk surface. **(11B-303.5)** Not required when adjacent to streets or highways and where a guard or handrail is provided with a guide rail centered 2" min. and 4" max above the finish surface.
I. Doors, doorways and gates: **(11B-404)**
a. Provide level areas 1:48 (2% max. slope in and direction at doors, doorways and gates.
b. Minimum maneuvering clearances at doors and gates shall comply with **(11B-404.2.4)**
J. Overhanging obstructions: Required a vertical 80" minimum from walking surface to bottom of obstruction. Where less than 80" min. high, provide a 27" max. guardrail or other barrier. Where a guy support is parallel to pedestrian path of travel provide a guy brace, sidewalk guy or similiar device to prevent a overhead obstruction **(11B-307.4.1).**

11. Alarm Notification Appliances (Section NFPA 72 and NFPA 101)
Fire alarm systems shall have permanently installed audible and visible alarms complying with **NFPA 72 and Chapter 9, Sections 907.5.2.1 and 907.5.2.3.** and carbon monoxide alarms shall comply with **Chapter 9, Section 915.**
A. Audible: Where fire alarm systems provide audible alarm coverage, alarms shall comply as detailed in **11B-215.1** for public and common areas, employee work areas, transient lodging, and residential facilities.
a. All audible devices shall produce a distinctive three pulse temporal tone. Audible signals shall have a sound level at least 15 dB above the average ambient sound level or 5dB above the maximum sound level having a duration of at least 60 seconds, whichever is greater measured 5 ft. above the floor.
b. Installed not less than 90" AFF or 6" below ceiling.
B. Visual:
a. Required whenever audible systems are required.
b. Strobes shall flash at a rate of not exceeding two flashes per second nor less than one flash every second.
c. Approved by State Fire Marshall
d. Installed between 80" and 96" AFF.
e. In hotels, motels, and dormitories, proprietor to post sign with 1/2" letters on contrasting background indicating which guest rooms provide visual alarms.

12. Signs and Identification
(2022 CBC Section 11B-216, and 11B-703)
See details:
A. Signage for each accessible facility.
B. Building directories. Identifying accessible facilities such as restrooms and elevators.
C. Braille (only when required): **(11B-703.3 & 11B-703.4)**
C.1. Contracted Grade 2 Braille.
C.2. Domed or rounded shape dots shall be 0.1" on centers in same cell with 0.3" on center between corresponding dots in adjacent cells, dot height (0.025" to 0.037"), dot base diameter (0.059" to 0.063"), distance between corresponding dots from one cell directly below (.0395" to 0.40") on center. Braille shall be positioned below the corresponding text in a horizontal format, flush left or centered. Braille shall be separated 3/8" min. and 1/2" max. from raised borders and decorative elements. If multi-lined text braille to be placed and separated 3/8" below the entire text.
D. Raised characters **(11B-703.2)** and pictograms (only when required):
D.1. Character style: Sans Serif **(11B-703.2.3)**
D.2. Case: Upper Case Characters.**(11B-703.2.2)**
D.3. Raised characters depth: 1/32" minimum. **(11B-703.2.1)**
D.4. Raised character height: 5/8" minimum, and 2" maximum. **(11B-703.2.5)**
D.5. Pictograms shall have a field height of 6" minimum. Characters and braille shall not be located in the pictgram field. **(11B-703.6)**
D.6. Finish and Contrast: Characters and symbols are required to contrast with their background and shall have a non-glare finish. **(11B-703.6.2) and (11B-703.7.1).**
E. Tactile characters on signs shall be located 48" min. above the finished floor or ground surface, measured from the baseline of the lowest Braille cells and 60" max. above the finish floor or ground surface measured from the baseline of the highest line of raised characters per **(CBC section 11B-703.4.1)**

13. Existing Buildings and Facilities
(2022 CBC Section 11B-202)
A. Additions: each addition to an existing building or facility shall comply with the requirements for new construction and **(Section 11B-202.4).**
B. Alterations: Where existing elements or spaces are altered, each element or space shall comply with the requirements for new construction and **(Section 11B-202.4)**.
C. Path of travel requirements in alterations, additions and structural repairs. **(Section 11B-202.4)** When alterations or additions are made to existing buildings or facilities, an accessible path of travel to the specific area of alteration or addition shall be provided. The primary accessible path of travel shall include.
C.1. A primary entrance to the building or facility,
C.2. Toilet and bathing facilities serving the area,
C.3. Drinking fountains serving the area,
C.4. Public telephones serving the area, and
C.5. Signs

Section 11B-202.4 Exceptions:
(Refer to section for exceptions 1-7)
Exception 8: When the adjusted construction cost exceed the current valuation threshold, as defined in Chapter 2, Section 202, and the enforcing agency determines the cost of compliance with Section 11B-202.4 is an unreasonable hardship, as defined in Chapter 2, Section 202, full compliance with Section 11B-202.4 shall not be required. Compliance shall be provided by equivalent facilitation or to the greatest extent possible without creating an unreasonable hardship; but in no case shall the cost of compliance be less than 20% of the adjusted construction cost of alteration,structural repairs or additions.

D. In choosing which accessible elements to provide, priority should be given to those elements that will provide the greatest access in the following order:
D.1 An accessible entrance;
D.2 An accessible route to altered area;
D.3 At least one accessible restroom for each sex or one accesssible unisex (singe-user or family) restroom;
D.4 Accessible telephones;
D.5 Accessible drinking fountains; and
D.6 When possible additional accessible elements such as parking, signs, storage, and alarms.
E. See **Section 11B-206.2.3** for additional requirements for multistory buildings and facilities without elevators.

14. Protruding Objects / Headroom
(2022 CBC Section 11B-307)
See detail: (7 / G1-41)
A. Headroom: Vertical clearance of 80" high min. in all exterior or interior way of passage for pedestrian travel including but not limited to, walks, hallways, corridors, courtyards, elevators, platform lifts, ramps, stairways and landings. **(11B-307.2)**
B. Protruding objects with leading edges more than 27" and not more than 80" above the finished floor may project 4" max. horizontally into circulation path. **(11B-307.2)**. **Exception:** handrails permitted to project 4 1/2" max.
C. Freestanding objects mounted on posts or pylons between 27" and 80" above floor may project 12" maximum. **(11B-307.3)**
D. Protruding objects not to reduce the clear width of an accessible route or maneuvering space. **(11B-307.5)**.

15. Space allowance and reach ranges for wheelchairs
(2022 CBC Section 11B-304, 11B-305, 11B-306, 11B-308 and Figures 11B-308.2.1 & 11B-308.2.2)
See details: (1 / G1-41) (2 / G1-41)
A. Minimum clear floor or ground space to accommodate a wheelchair is 30" min. x 48" min. **(11B-305)**
B. Clear width: 36" min. Except the clear width is permitted to be reduced to 32"min. for a 24" max. length provided the reduced width segments are separated by segments that are 48" min. long by 36" min. wide. See **(Figure 11B-403.5.1)**.
C. Minimum width for two wheelchairs to pass is 60" min. See passing spaces in **(11B-403.5.3.)**
D. Minimum space for a wheelchair to make a 180 degree turn is 60" min. diameter circle or a T-shaped space. See **(Figure 11B-304.3.2)**.
E. May be positioned for forward or side approach to an object.
F. Minimum clear floor space may be part of the knee and toe clearance complying with **(11B-306)**.
G. Approach: One full unobstructed side of clear floor space adjoins an accessible route or adjoins another clear floor space.
H. Alcoves: Forward approach alcoves are 36" wide min. where depth exceeds 24". Parallel approach alcoves are 60" wide min. where the depth exceeds 15". **(11B-305.7)**
I. Reach height for forward approach without obstruction is between 15"min. and 48" max. above floor. **(Figure 11B-308.2.1)**
J. Reach Height for forward approach over an obstruction: **(Figure 11B-308.2.2)**

Reach Height	Obstruction Depth
44" max.	20" - 25"
48" max.	less than 20"

K. Reach Height for side approach over an obstruction 34" max. high: **(11B-308.3.2)**

Reach Height	Obstruction Depth
48" max.	10" maximum
46" max.	10"-24" maximum

L. Reach height for side approach without obstruction is between 15" min. and 48" max. above floor. **(11B-308.3.1)**

16. Electrical Switches
(2022 CBC Section 11B-308.1.1)
Controls and switches intended to be used by the occupant of a room or area to control lighting and receptacle outlets, appliances or cooling, heating and ventilating equipment shall comply with **Section 11B-308** except the low reach (15 inches) shall be measured to the bottom of the outlet box and the high reach (48 inches) shall be measured to the top of the outlet box.

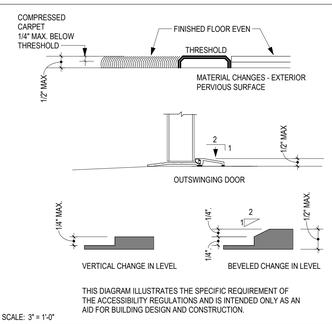
17. Electrical Receptacle Outlets
(2022 CBC Section 11B-308.1.2)
A. Electrical receptacle outlets on branch circuits of 30 amps or less and communication system receptacles shall comply with **Section 11B-308** except the low reach (15 inches) shall be measured to the bottom of the outlet box and the high reach (48 inches) shall be measured to the top of the outlet box.

19. Doors, Doorways, and Gates
(2022 CBC Section 11B-404 & Figures 11B-404.2.3 & 11B-404.2.4.1)
See details: (10 / G1-41) (11 / G1-41) (12 / G1-41) (13 / G1-41)
A. Level and clear space on swing side: 60" at 90 deg. to door in closed position.
B. Level and clear space on side away from swing: 48" at 90 deg. to door in closed position. 44" if no closer and approach can be made from latch side. **(11B-404.2.4 & Table 11B-404.2.4.1)**
C. Space provided past strike edge of door on swing side: 18" for interior doors, 24" for exterior doors.
D. Space provided past strike edge on push side of door: 12" if door is equipped with both a latch and closer.
E. Width: 32" min. clear opening (36" door) - measured from face of door and the stop, with door open 90 degrees. **(11B-404.2.3 & Figure 11B-404.2.3)**.
F. Height: 80" min.
G. Pair of doors - at least one active door to be 32" min. clear width when open at 90 deg. **(11B-404.2.2)**
H. No revolving doors, revolving gates, and turnstiles shall be part of an accessible route. **(11B-404.3.7)**
I. 10" smooth uninterrupted surface at the bottom, on the push side of door or gate extending the full width. **(11B-404.2.10)**

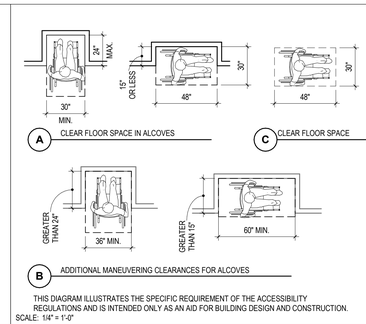
20. Hardware & Operable Parts
(2022 CBC Section 11B-309 & 11B-404)
A. Height of door hardware: centered between 34"min. and 44" max. above the finished floor or ground. **(11B-404.2.7)**
B. Operation: Operable parts shall be operable by a single effort, no tight grasping, tight pinching or twisting of the wrist (levers, push-pulls, or panic devices are O.K.). **(11B-309)**
C. Allowable closer pressure: **(11B-404.2.9)**
a. Interior & Exterior doors: 5 lbf maximum.
b. Fire doors (if required): 15 lbf maximum
D. Thresholds: Maximum height of 1/2". **(11B-404.2.5)** Changes between 1/4" and 1/2" must be sloped 1:2 max. **(11B-303.3)**
E. Closer timing min. 5 seconds from 90 deg.-12 deg. from latch. **(11B-404.2.8)**
F. Provide lever actuated latches or locks that are curved with a return to within 1/2" of the door to prevent catching of clothing.
G. Where sliding doors are in full open position, operating hardware shall be exposed and useable from both sides per **Section 11B-404.2.7.**

21. Doors in Series and Gates in a Series
(2022 CBC Section 11B-404.2.6 and Figure 11B-404.2.6)
A. The distance between two hinged or pivoted doors in a series and gates in a series shall be 48' min. plus the width of the doors or gates swinging into the space.

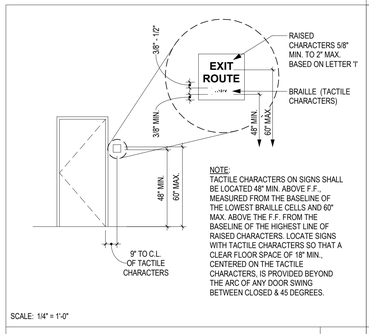
22. Corridors and Aisles
(2022 CBC Sections 1018 and 1020)
See details: (6 / G1-41) (3 / G1-41)
A. Corridor width: 44" minimum (occupant load of 10 or more); 36" minimum (occupant load of less than 10) **(1020.2) and (11B-403.5.1)**
B. Corridors over 200 ft. **(11B-403.5.3)**
B.1. 60" min. clear width.
B.2. 60" x 60" passing areas located at intervals of 200 ft. max. if less than 60" clear width accessible route.
B.3. 'T' intersection of 2 or more corridors or walks is acceptable passing place.
C. Aisle leading to an exit **(1018.1)**.
C.1. Aisles or aisle accessways shall be provided from all occupied portions of the exit access that contain seats, tables, furnishings, displays and similiar fixtures or equipment. The minimum width or required capacity of the aisle shall be unobstructed. **(1018.1).**
C.2. When serving one side, 36" minimum width. **(11B-403.5.1 ex. 4).**
C.3. When serving both sides, 44" minimum width. **(11B-403.5.1 ex. 4).**
C.4. Assembly side obstructions. Handrails are permitted to project into the required width of a stepped aisle and ramped aisle. **(1029.9.6.1 ex.)**
D. Clear width at turn. **(11B-403.5.2)** Where the accessible route makes a 180 degree turn around an element which is less than 48" min. wide, clear width shall be 42" min. approaching the turn and 42" min. leaving the turn.



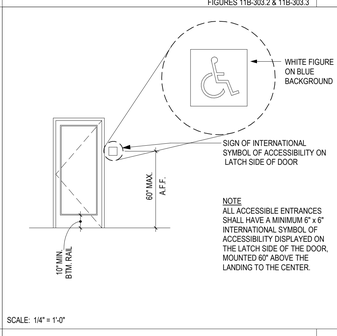
THRESHOLDS — 2022 CBC SECTION 11B-404.2.5 & FIGURES 11B-303.2 & 11B-303.3 — 10



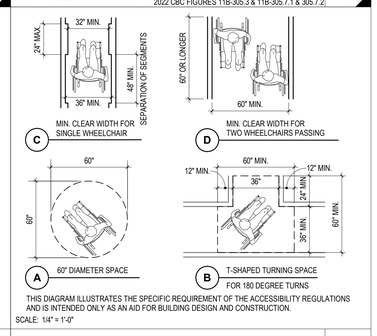
MIN. CLEAR FLOOR SPACE — 2022 CBC FIGURES 11B-305.3 & 11B-305.7.1 & 305.7.2 — 5



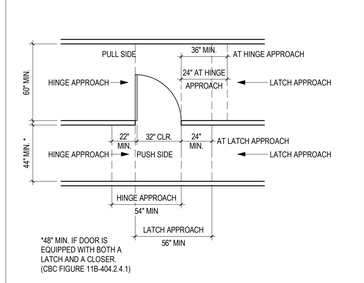
TACTILE & RAISED CHARACTER SIGNS — 2022 CBC FIGURES 11B-703.7.3.2 & 11B-703.4.1 — 14



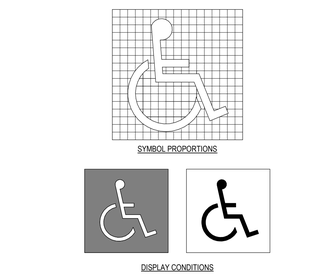
ENTRANCE SIGNAGE — 2022 CBC 11B-216 & FIGURE 11B-703.7.2.1 — 9



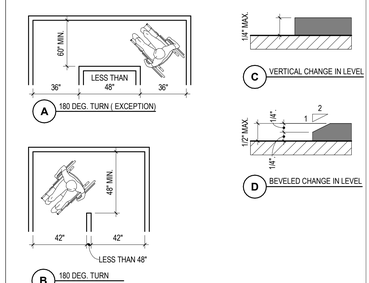
WHEELCHAIR PASSAGE WIDTH — 2022 CBC FIGURES 11B-304.3.2 & 11B-403.5.1 — 4



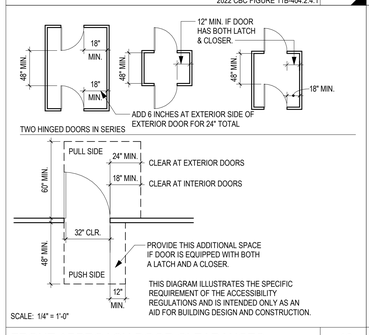
SIDE APPROACH DOOR CLEARANCES — 2022 CBC FIGURE 11B-404.2.4.1 — 13



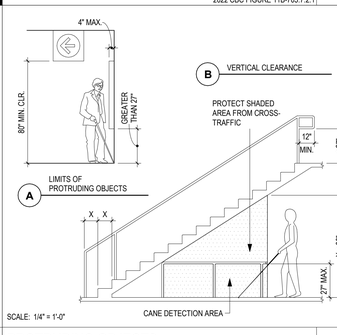
ACCESSIBILITY SYMBOL — 2022 CBC FIGURE 11B-703.7.2.1 — 8



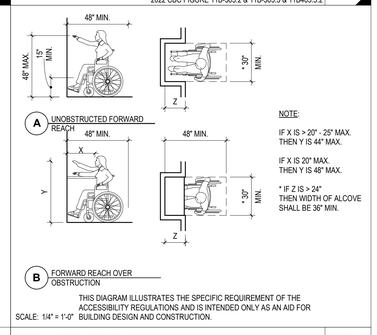
ACCESSIBLE ROUTE — 2022 CBC FIGURE 11B-303.2 & 11B-303.3 & 11B403.5.2 — 3



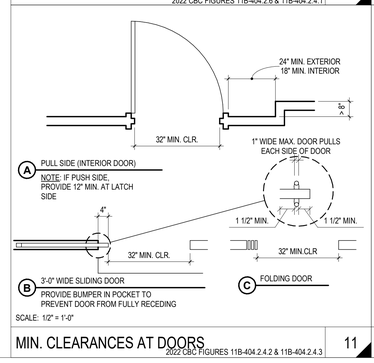
FRONT APPROACH DOOR CLEARANCES — 2022 CBC FIGURES 11B-404.2.6 & 11B-404.2.4.1 — 12



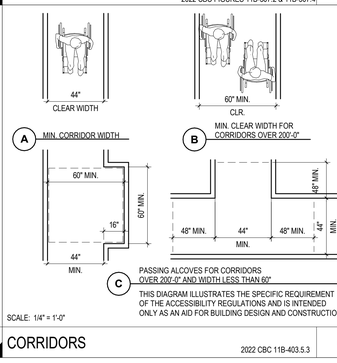
PROTRUDING OBJECTS — 2022 CBC FIGURES 11B-307.2 & 11B-307.4 — 7



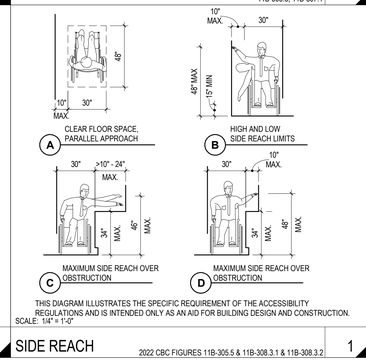
FORWARD REACH — 2022 CBC FIGURE 11B-308.2.1 & 11B-308.2.2 11B-305.5, 11B-307.1 — 2



MIN. CLEARANCES AT DOORS — 2022 CBC FIGURES 11B-404.2.4.2 & 11B-404.2.4.3 — 11



CORRIDORS — 2022 CBC 11B-403.5.3 — 6



SIDE REACH — 2022 CBC FIGURES 11B-305.5 & 11B-308.3.1 & 11B-308.3.2 — 1

DAHLIN
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PW-23-01

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ACCESSIBILITY NOTES & DIAGRAMS COMMON ROUTES (CBC 11B)

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25. Drinking Fountains
(2022 CBC Section 11B-211 & 11B-602 Figure 11B-602.5)
See Detail:

A. No fewer than (2) drinking fountains shall be provided. When provided one (1) drinking fountain shall be wheelchair accessible and one (1) drinking fountain shall be for standing persons ("Hi-low" fountains). Where there are more than 2 drinking fountains, provide 50% of the total drinking fountains provided shall be wheelchair accesible, and 50% of the total drinking fountains provided shall be for standing persons.
B. All drinking foutains to be completely within alcoves, positioned completely between wing walls, or otherwise positioned so as not to encroach into pedestrian ways. **(11B-602.9)** The protected area within which a drinking fountain is located shall be as follows;
   a. Width: 32" minimum Depth: 18" minimum.
   b. Forward approach alcoves are 36" wide min. when the depth exceeds 24".
   c. Parallel approach alcoves are 60" wide min. where the depth exceeds 15".
   d. When used, wing walls or barriers shall project horizontally at lest as far as the drinking fountain and to within 6" vertically from the floor or ground surface.
C. Wall and post-mounted cantilevered drinking fountains shall be 18" min.and 19" max. in depth.
D. Knee space: 27" high between bottom of apron & the floor x 8" min. deep (front edge to back wall) x 30" width.
E. Toe clearance: 9" above floor x 17" min. depth from front edge of the fountain.
F. 30" x 48" clear floor space in front of the drinking fountain for forward approach.
G. Operable Parts are operable with one hand and do not require tight grasping, pinching or twisting of the wrist. **(11b-309.4)** The flow of the water shall be activated by a manually operated system that is front mounted and located 6" of the front edge of the fountain or electronically controlled device. **(11B-602.3)**
H. Water flow: The spout shall provide a flow of water 4" high min. and shall be located 5" max. from the front edge of the unit. The angle of the water stream shall be measured horizontally relative to the front face of the unit. **(11B-602.6)**
   a. Where spouts are located less than 3" of the front of the unit, angle of the water stream shall be 30 degrees max.
   b. Where spouts are located between 3" and 5" max. from the front of the unit, the angle of the water stream shall be 15 degrees max.
I. Spout height: Spout outlets shall be 36" max. above the finish floor or ground. **(11B-602.4)**
J. Spout location: The sprout outlets shall be located 15" min. from the vertical support and 5" max. from the front edge of the unit, including bumpers. **(11B-602.5)**
K. Spout outlets of drinking fountains for standing persons shall be 38" min. and 43" max. above finished floor. **(11B-602.7)**

27. Access to Water Closets and Sanitary Facilities
Entry to Sanitary Facilities: General for both multiple and single accommodations. **(2022 CBC Section 11B-216.8 & 11B-703.7) See**(NOTE 30 / G1-42) **& Detail:** (9 / G1-42)

A. Signage:
   A.1. Men's room: equilateral triangle 1/4" thick, edges 12" long, & a vertex pointing upward **(11B-703.7.2.6.1)**
   A.2. Women's room: Circle 12" diameter, 1/4" thick. **(11B-703.7.2.6.2)**
   A.3. Unisex room: 1/4" thick triangle within and superimposed on 12" diameter, 1/4" thick circle. **(11B-703.7.2.6.3)**
   A.4. Mounting Location: 58" min. and 60" max. above finish floor measured from the centerline of the symbol. Where a door is provided the symbol is mounted 1" of the centerline of door. **(11B-703.7.2.6).**
   A.5. Contrasting color with respect to the door, either light on a dark background or dark on a light background. (Unisex circle symbol shall be contrasting symbol.)
   A.6. Tactile Characters on signs shall be located 48" min. A.F.F. or ground surface, measured from the baseline to the lowest braille cells. **(11B-703.4.1)**
   See Detail: (9 / G1-42)
   A.7. International symbol of accessibility shall be white figure on blue background **(11B-703.7.2.1).** Note: The appropriate enforcement agencies may approve other colors to compliment decor or design. The symbol contrast shall be either light on dark or dark on a light background.
   A.8. Edges of the signs are rounded, chamfered or eased, and any corners have a minimum radius of 1/8". **(11B-703.7.2.6.4)**
B. Doorways: 32" clear opening width.
C. Level and clear area on swing side of door: 60" measured at 90 degrees to door in closed position extending 18" beyond strike edge (24" at exterior doors).
D. Level and clear area opposite swing side of door: 48" measured at 90 degrees to door in closed position extending 12" beyond strike edge (if equipped with closer and latch).

28. Multiple Accommodation Toilet Rooms
(2022 CBC Section 11B-604) (Figure 11B-1B)
See (NOTE 30 / G1-42) **& Details** (2 / G1-42)

A. Unobstructed access to accessible stall (except for door opening widths and door swings) of 44" clear. **(11B-604.8.2.2)**
B. 60" diameter circle turning space extending 27" above floor shall be provided within room. **(11B-304.3. & 11B-603.2.1)**
   B.1. Doors may encroach into turning space space up to 12" except door to accessible stall. **(11B-603.2.3)**
   B.2. Lavatories required to be accessible by **Section 11B-213.3.4**, space between 9" and 29" A.F.F. or ground, shall be considered knee clearance. **(11B-306.3.1)**
C. Wheelchair Accessible Compartments: **(11B-604.8.1)**
   C.1. Size: Wheelchair accessible compartments shall be 60" min. wide measured perpendicular to the side wall, and 56" deep min. for wall hung water closets and 59" deep min. for floor mounted water closets measured perpendicular to rear wall.
   C.2. Manuevering space with In-swing door: In a wheelchair accessible compartment with an in-swinging door, a min. 60" wide by 36" deep maneuvering space shall be provided in front of the 56" or 59" depth clearances.
   C.3. Manuevering space with side opening door: In a wheelchair-accessible compartment with a door located in the side wall or partition, either in-swinging or out-swinging, a min. 60" wide by 60" deep maneuvering space shall be provided in front of the the water closet.
   C.4. Manuevering space with end opening door: In a wheelchair-accessible compartment with a door located in the front wall or partition (facing the water closet), either in-swinging or out-swinging, a min. 60" wide and 48" deep maneuvering space shall be provided in front of the the water closet.
D. Compartment Doors: **(11B-604.8.1.2)**
   D.1. 32" minimum clear where compartment has end opening door.
   D.2. 34" minimum clear where compartment has side opening door.
   D.3. The door is self-closing.
   D.4. Where located in front partition, the door opening shall be 4" max. from the side wall or partition farthest from the water closet. **(Figure 11B-604.8.1.2)**
   D.5. Where located in the side wall or partition, the door opening shall be 4" max. from the front partition. **(Figure 11B-604.8.1.2)**
   D.6. When appproach is from the push side of the compartment door, clearance between side of door and any obstruction shall be 48" min. clear at 90 degrees to door in closed position. **(11B-604.8.1.2)**

28. Multiple Accommodation Toilet Rooms Cont.
   D.7. Door pull is placed on both sides of door near the latch. **(11B-404.2.7)**
   D.8. The door pulls, have a shape that is operable with one hand and does not require tight grasping,pinching or twisting of the wrist. The force required to activate the operable parts on doors is 5 lbs. max. **(11B-309.4 & 11B-404.2.7)**
E. Centerline of water closet to wall: 17"min.to 18"max. from sidewall.
F. Grab bars **(11B-604.8.1.5)**.
G. See notes for general toilet room fixtures and accessories for further requirements. **See** (NOTE 30 / G1-42)
H. Provide at least one "Ambulatory Accessible Compartment" measuring (35" min. to 37" max. in width by 60" min.in depth), when six or more toilet compartments are provided or the combination of urinals and water closets totals six or more fixtures. Provide a out-swinging, self-closing door and parallel grab bars complying with section **(11B-604.8.2).**
I. Compartment toe clearance: at least one side of partition shall provide a toe clearance of 9" min. above the finish floor and 6" deep min. beyond the compartment side face of the face of the partition, exclusive of partition support members. Compartments for children's use shall provide a toe clearance of 12" min above finish floor. **(11B-604.8.1.4 & Figure 11B-604.8.1.4)**

29. Single Accommodation Toilet Rooms:
Definition: A room with no more than one of each type of sanitary fixture, is intended for use by only one person at a time, has no partition around the toilet and has a door that can be locked on the inside by the room occupant. **(2022 CBC Section 11B-603 and Figure 11B-604.3.1 & 11B-604.3.2) See** (NOTE 30 / G1-42) **& Details**

A. Space inside: room for a wheelchair 30" x 48" to enter and close door. **(11B-305.5)**
B. 60" diameter circle **(11B-304.3.1)** or T-shaped space. **(11B-304.3.2)** No door shall encroach more 12" into this space. **(11B-304.4)**
C. The clearance around water closet is 60" min. wide measured perpendicular from side wall, 56" min. measured perpendicular to rear wall. **(Figure 11B-604.3.1)**
D. The centerline of the water closet is located 17" min to 18" max.
   distance from the side-wall. **(Figure 11B-604.2)**
E. Clear space in front of water closet: 60" min. wide and 48" min. deep. **(11B-604.3.1)** (5 / G1-42)
F. Grab bars: **See**
G. See general toilet fixtures and accessories for further requirements. **See** (10 / G1-42)
   G.1 Privacy latch at entrance complying with **(11B-309.4 11B-404.2.7)**
H. Lavatory: 18" minimum to wall from center of lavatory.
I. Doors shall not swing into clear floor space required for any fixture. **(11B-404 & 11B-604.8.1.2)**

30. General Toilet Room Fixtures and Accessories
(2022 CBC Sections 11B-305, 11B-306, 11B-603 - 11B-606, and 11B-609) See Details: (4 / G1-42) (5 / G1-42) (6 / G1-42) (7 / G1-42) (10 / G1-42)

A. Grab Bars **(Sections 11B-604.5 & 11B-604.8.1.5 & 11B-609 and Figures 11B-604.5.1 & 11B-604.5.2)** Grab bars are provided on the side wall closest to the water closet and on the rear wall. An "L-Shaped" grab bar meeting Sections **(11B-604.5.1 and 11B-604.5.2)** shall be permitted.
   A.1. Height: 33" min.-36" max. above the finished floor measured to the top of the gripping surface. **(11B -609.4)**
   A.2. Rear wall: The rear wall grab bar is a minimum of 36" in length and extends from the centerline of the water closet 12" minimum on one side and 24" minimum on other side. **(11B-604.5.2 and Figure 11B-604.5.2)**
   A.3. Side wall: The side wall grab bar is a minimum of 42" in length. **(11B-604.5.1 and Figure 11B-604.5.1)**
   A.3.1. The side wall grab bar is located 12" maximum from the rear wall and extends 54" minimum from the rear wall with the front end positioned 24" minimum in front of the water closet.
   A.4. Cross section: Outside diameter 1 1/4" min. to 2" max. or a non-circular cross section of 2" max. and a perimeter dimension of 4" min. and 4.8" max. **(11B-609.2)**
   A.5. Spacing: The space between wall and grab bar is 1 1/2". **(11B-609.3)**
   A5.1. The space between the grab bar and projecting objects below and at ends shall be 1 1/2" min.
   A5.2. The space between the grab bar and projecting objects above shall be 12" min.
   A.6. Fittings: Grab bars shall not rotate within their fittings.
   A.7. Surface Hazards: The grab bar(s) and any wall or other surfaces adjacent to the grab bars is free of sharp or abrasive elements and shall have rounded edges.
   A.8. Structural strength: allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 lbs. is applied at any point on the grab bar, shower seat, fastener, mounting device, or supporting structure. **(11B-609.8)**
   A.9. Ambulatory accessible toilet compartments grab bars go on both sides of the compartment. The side wall grab bars are 42" min. in length. and located 12" max. from the rear wall and extend 54" min. from the rear wall with the front ends positioned 24" min. in front of the water closet. **(11B-604.5.1)**
B. Urinals: **(11B-605) (Figure 11B-605.2)**
   The accessible urinal is the stall type or wall hung type. Where one or more is provded, at least one is accessible and shall comply as follows.
   B.1. Height: Urinal rim is located 17" max. above finish floor.
   B.2. Depth: 13 1/2" deep minimum measured from the outer face of the urinal rim to the back of the fixture.
   B.3. Clear floor space: Clear space in front of fixture 30" wide x 48" deep for forward approach.
   B.4. Flush control: operable with one hand and shall not require tight grasping, pinching or twisting of wrist; mounted 44" max. above floor; 5lb. max. force to operate. Automatic flushing controls are acceptable and preferred. **(11B-605.4)**
   B.5. Fixtures placed in alcoves to comply with **Section 11B-305.7 and Figure 11B-305.7.1 See Detail:**
C. Lavatories **(Section 11B-606)** Where lavatories are provided, at least (5%), but no fewer than one lavatory, shall be made accessible and not located in a toilet compartment.
   C.1. All accessible lavatories: 18" minimum to the center line of fixture to any adjacent side wall finish or partition, 17" minimum in horizontal depth.
   C.2. Rim or counter height: 34" maximum above finished floor.
   C.3. Knee clearance: 30" min. wide with a space of 27" high max. above the finish floor at a depth 8" min. increasing to 29" high min. above the finish floor at the front edge of a counter with a built-in lavatory or at the front edge of a wall mounted lavatory fixture. **(11B-306.3.3. Ex.1)**
   C.4. Clear floor space: 30" wide x 48" deep in front of fixture to allow for a forward approach and shall extend 19" maximum into knee and toe space underneath the lavatory. **(11B-606.2)**
   C.5. Toe clearance: 30" wide, with a space under the lavatory between 9" high above the finish floor, extending to 19" maximum under lavatory. **(11B 306.2.2)**
   C.6. Hot water and drain pipes insulated or covered, with no sharp or abrasive surfaces under lavatories. **(11B-606.5)**

39. Public Utility Facilities
(Access required at the following)

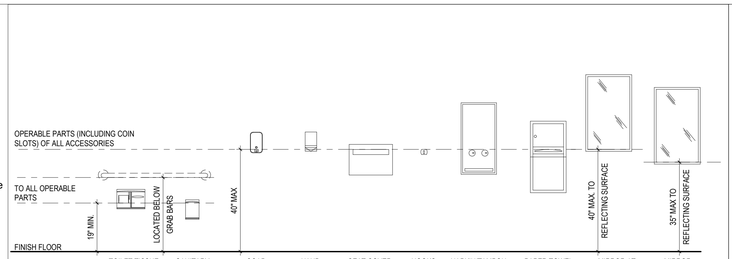
A. Office areas, meeting rooms, toilet rooms, and parking.
B. Public tour areas.
C. Exception for "operational" areas.
D. Visitor overlook facilities, orientation areas.

41. Storage
(2022 CBC Section 11B-225 & 11B-811)

A. Where storage is provided in accessible spaces, at least one of each type shall comply with **Section 11B-811**. Storage types include, but not limited to, closets, cabinets, shelves, clothes rods, hooks, and drawers.
B. A clear floor space 30" x 48" complying with **Section 11B-305**.
C. Height: Storage elements shall comply with at least one of the reach ranges per **Section 11B-308**. **See**
D. Operable parts shall comply with **Section 11B-309**.
   See
E. Where lockers are provide, at least 5%, but no fewer than one of each type, shall comply with **Sections 11B-811 & 11B-308**. Hardware & padlocks shall comply with operable parts **Section11B-309**. **See and**
F. Library book stacks: Book stacks available for public use shall be 54" max. above finish floor. **(11B-225.2.3)**
G. Self-service shelves shall be located on a compliant accessible route **(11B-402)**. Self-service shelving shall not be required to comply with Section 11B-308 Reach Ranges. **(11B-225.2.2)**

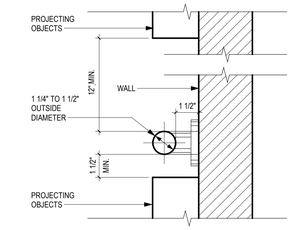
43. Accessible Kitchen Sinks
(2022 CBC Section 11B-606)

A. Clear floor space: 30"x 48" in front of sink for forward approach.
   A. 1. Clear floor space shall extend underneath the sink. **(11B-306.3.3)**
B. Sink depth where a forward approach is required at sink, knee and toe clearance shall be provided in compliance with **Section 11B-306. (11B-606.7).**
C. Counter or sink rim: 34" maximum height. **(11B-606.3)**
D. 30" min. wide knee clearance of 27" high max. A.F.F. at a depth 8" min. increasing to 29" high min. A.F.F. at the front edge of a counter with built-in sink or the front edge of a wall mounted sink. **(11B-306.3).** Toe space to extend 19" min. to 25" max under sinks. **(11B-306.2).**
E. Hot water and drain pipes exposed under sinks shall be insulated or configured to protect against contact. No sharp or abrasive surfaces below sink. **(11B-606.5)**
F. Faucets and controls shall operate with 5lbs-force maximum and be operable without tight grasping, pinching or twisting of the wrist. **(11B-606.4)**
G. Lever operated, push-type and electronically controlled mechanisms are acceptable. Self closing valves are allowed if faucet remains open for at least 10 seconds min.. **(11B-606.4).**
H. Where sinks are provided, at least 5%, but no fewer than one, of each type provide in an acessible room or space shall be accessible. **(11B-212.3**). Mop, service or scullery sinks shall not be required to comply.
I. A parallel approach that complies with Section 11B-305, clear floor or ground space shall be permitted to a kitchen sink in a space where a cook top or conventional range is not provided and to wet bars.



SCALE: 1/2" = 1'-0" * ALL ACCESSIBLE RESTROOM ACCESSORIES TO BE MOUNTED AT THESE HEIGHTS U.O.N.

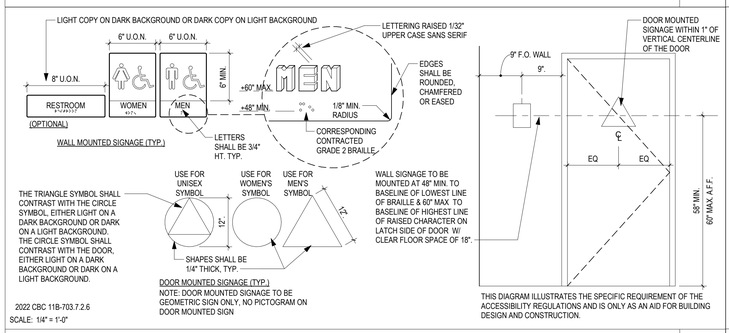
ACCESSORY MOUNTING HEIGHTS — 10



THIS DIAGRAM ILLUSTRATES THE SPECIFIC REQUIREMENT OF THE ACCESSIBILITY REGULATIONS AND IS INTENDED ONLY AS AN AID FOR BUILDING DESIGN AND CONSTRUCTION.

SCALE: 3" = 1'-0"

SECTION THROUGH TYP. GRAB BAR — 5
2022 CBC FIGURE 11B-609.3



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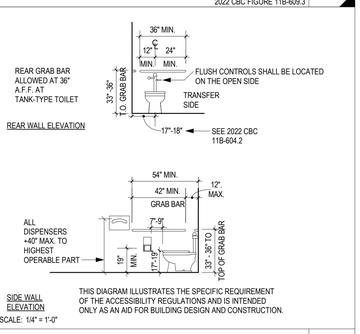
SCALE: 1/4" = 1'-0"

RESTROOM SIGNAGE — 9



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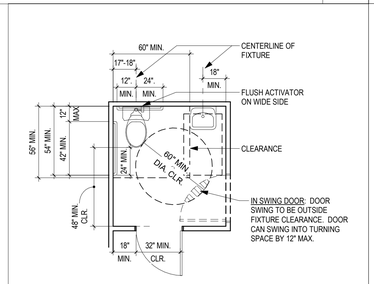
SCALE: 1/4" = 1'-0"

ACCESSIBLE TOILET ELEVATION — 4
2022 CBC FIGURES 11B-604.5.1 & 11B-604.5.2



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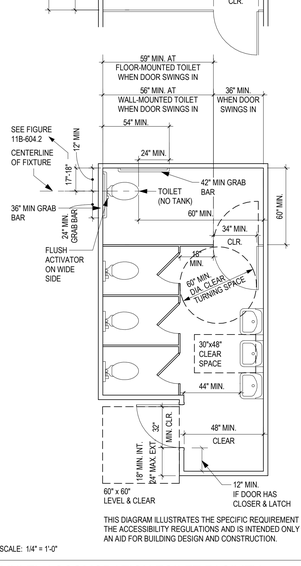
SCALE: 1/4" = 1'-0"

SINGLE-ACCOMODATION TOILET — 8
2022 CBC FIGURE 11B-604.3.2



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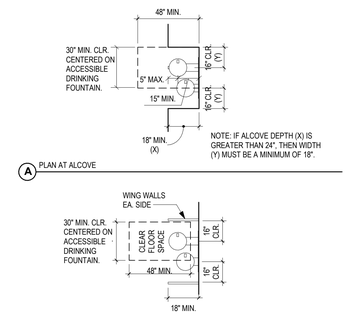
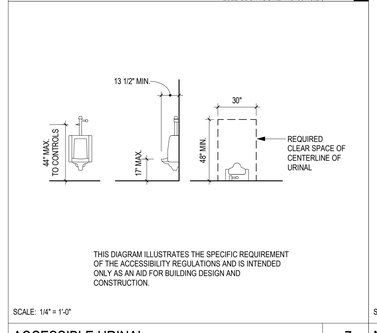
SCALE: 1/4" = 1'-0"

MULTI. ACCOMODATION TOILET FACILITY — 2
2022 CBC FIGURE 11B-604.8.1.1.2





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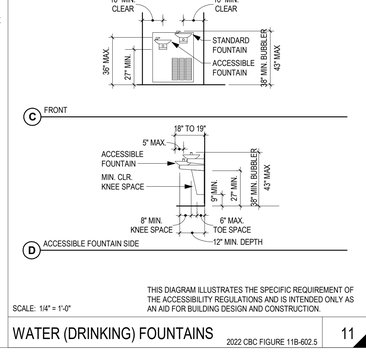
SCALE: 1/4" = 1'-0"

ACCESSIBLE URINAL — 7
2022 CBC FIGURE 11B-605.2

THIS DIAGRAM ILLUSTRATES THE SPECIFIC REQUIREMENT OF THE ACCESSIBILITY REGULATIONS AND IS INTENDED ONLY AS AN AID FOR BUILDING DESIGN AND CONSTRUCTION.

SCALE: 1/4" = 1'-0"

FRONT DOOR MULTIPLE TOILET FACILITY — 1
2022 CBC 11B-604.8.1.2, 11B-604.8.1.1.3 & FIGURE 11B-604.8.1.2



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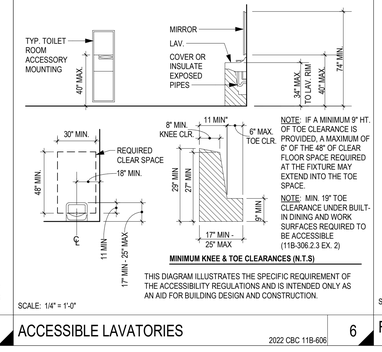
SCALE: 1/4" = 1'-0"

WATER (DRINKING) FOUNTAINS — 11
2022 CBC FIGURE 11B-602.5



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SCALE: 1/4" = 1'-0"

ACCESSIBLE LAVATORIES — 6
2022 CBC 11B-606

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ACCESSIBILITY NOTES & DIAGRAMS COMMON FACILITIES (CBC 11B)

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2022 CALIFORNIA GREEN BUILDING STANDARDS CODE
NONRESIDENTIAL MANDATORY MEASURES, SHEET 1 (January 2023)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie. ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

CHAPTER 3
GREEN BUILDING
SECTION 301 GENERAL

301.1 SCOPE. Buildings shall be designed to include the green building measures specified as mandatory in the application checklists contained in this code. Voluntary green building measures are also included in the application checklists and may be included in the design and construction of structures covered by this code, but are not required unless adopted by a city, county, or city and county as specified in Section 101.7.

301.3 NONRESIDENTIAL ADDITIONS AND ALTERATIONS. [BSC-CG] The provisions of individual sections of Chapter 5 apply to newly constructed buildings, building additions of 1,000 square feet or greater, and/or building alterations with a permit valuation of $200,000 or above (for occupancies within the authority of California Building Standards Commission). Code sections relevant to additions and alterations shall only apply to the portions of the building being added or altered within the scope of the permitted work.

A code section will be designated by a banner to indicate where the code section only applies to newly constructed buildings [N] or to additions and/or alterations [A]. When the code section applies to both, no banner will be used.

301.3.1 Nonresidential additions and alterations that cause updates to plumbing fixtures only:

Note: On and after January 1, 2014, certain commercial real property, as defined in Civil Code Section 1101.3, shall have its noncompliant plumbing fixtures replaced with appropriate water-conserving plumbing fixtures under specific circumstances. See Civil Code Section 1101.1 *et seq.* for definitions, types of commercial real property affected, effective dates, circumstances necessitating replacement of noncompliant plumbing fixtures, and duties and responsibilities for ensuring compliance.

301.3.2 Waste Diversion. The requirements of Section 5.408 shall be required for additions and alterations whenever a permit is required for work.

301.4 PUBLIC SCHOOLS AND COMMUNITY COLLEGES. (see GBSC)
301.5 HEALTH FACILITIES. (see GBSC)

SECTION 302 MIXED OCCUPANCY BUILDINGS

302.1 MIXED OCCUPANCY BUILDINGS. In mixed occupancy buildings, each portion of a building shall comply with the specific green building measures applicable to each specific occupancy.

SECTION 303 PHASED PROJECTS

303.1 PHASED PROJECTS. For shell buildings and others constructed for future tenant improvements, only those code measures relevant to the building components and systems considered to be new construction (or newly constructed) shall apply.

303.1.1 Initial Tenant improvements. The provisions of this code shall apply only to the initial tenant improvements to a project. Subsequent tenant improvements shall comply with the scoping provisions in Section 301.3 non-residential additions and alterations.

ABBREVIATION DEFINITIONS:

HCD	Department of Housing and Community Development
BSC	California Building Standards Commission
DSA-SS	Division of the State Architect, Structural Safety
OSHPD	Office of Statewide Health Planning and Development
LR	Low Rise
HR	High Rise
AA	Additions and Alterations
N	New

CHAPTER 5
NONRESIDENTIAL MANDATORY MEASURES
DIVISION 5.1 PLANNING AND DESIGN
SECTION 5.101 GENERAL

5.101.1 SCOPE
The provisions of this chapter outline planning, design and development methods that include environmentally responsible site selection, building design, building siting and development to protect, restore and enhance the environmental quality of the site and respect the integrity of adjacent properties.

SECTION 5.102 DEFINITIONS

5.102.1 DEFINITIONS
The following terms are defined in Chapter 2 *(and are included here for reference)*

CUTOFF LUMINAIRES. Luminaires whose light distribution is such that the candela per 1000 lamp lumens does not numerically exceed 25 (2.5 percent) at an angle of 90 degrees above nadir, and 100 (10 percent) at a vertical angle of 80 degrees above nadir. This applies to all lateral angles around the luminaire.

LOW-EMITTING AND FUEL EFFICIENT VEHICLES.
Eligible vehicles are limited to the following:

1. Zero emission vehicle (ZEV), enhanced advanced technology PZEV (enhanced AT ZEV) or transitional zero emission vehicles (TZEV) regulated under CCR, Title 13, Section 1962.
2. High-efficiency vehicles, regulated by U.S. EPA, bearing a fuel economy and greenhouse gas rating od 9 oe 10 as regulated under 40 CFR Section 600 Subpart D.

NEIGHBORHOOD ELECTRIC VEHICLE (NEV). A motor vehicle that meets the definition of "low-speed vehicle" either in Section 385.5 of the Vehicle Code or in 49CFR571.500 (as it existed on July 1, 2000), and is certified to zero-emission vehicle standards.

TENANT-OCCUPANTS. Building occupants who inhabit a building during its normal hours of operation as permanent occupants, such as employees, as distinguished from customers and other transient visitors.

VANPOOL VEHICLE. Eligible vehicles are limited to any motor vehicle, other than a motortruck or truck tractor, designed for carrying more than 10 but not more than 15 persons including the driver, which is maintained and used primarily for the nonprofit work-related transportation of adults for the purpose of ridesharing.

Note: Source: Vehicle Code, Division 1, Section 668

ZEV. Any vehicle certified to zero-emission standards.

SECTION 5.106 SITE DEVELOPMENT

5.106.1 STORM WATER POLLUTION PREVENTION FOR PROJECTS THAT DISTURB LESS THAN ONE ACRE OF LAND. Newly constructed projects and additions which disturb less than one acre of land, and are not part of a larger common plan of development or sale, shall prevent the pollution of storm water runoff from the construction activities through one or more of the following measures:

5.106.1.1 Local ordinance. Comply with a lawfully enacted storm water management and/or erosion control ordinance.

5.106.1.2 Best Management Practices (BMPs). Prevent the loss of soil through wind or water erosion by implementing an effective combination of erosion and sediment control and good housekeeping BMPs.

1. Soil loss BMPs that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Scheduling construction activity during dry weather, when possible.
   b. Preservation of natural features, vegetation, soil, and buffers around surface waters.
   c. Drainage swales or lined ditches to control stormwater flow.
   d. Mulching or hydroseeding to stabilize disturbed soils.
   e. Erosion control to protect slopes.
   f. Protection of storm drain inlets (gravel bags or catch basin inserts).
   g. Perimeter sediment control (perimeter silt fence, fiber rolls).
   h. Sediment trap or sediment basin to retain sediment on site.
   i. Stabilized construction exits.
   j. Wind erosion control.
   k. Other soil loss BMPs acceptable to the enforcing agency.
2. Good housekeeping BMPs to manage construction equipment, materials, non-stormwater discharges and wastes that should be considered for implementation as appropriate for each project include, but are not limited to, the following:
   a. Dewatering activities.
   b. Material handling and waste management.
   c. Building materials stockpile management.
   d. Management of washout areas (concrete, paints, stucco, etc.).
   e. Control of vehicle/equipment fueling to contractor's staging area.
   f. Vehicle and equipment cleaning performed off site.
   g Spill prevention and control.
   h. Other housekeeping BMPs acceptable to the enforcing agency.

5.106.2 STORMWATER POLLUTION PREVENTION FOR PROJECTS THAT DISTURB ONE OR MORE ACRES OF LAND. Comply with all lawfully enacted stormwater discharge regulations for projects that (1) disturb one acre or more of land, or (2) disturb less than one acre of land but are part of a larger common plan of development sale.

Note: Projects that (1) disturb one acre or more of land, or (2) disturb less than one acre of land but are part of the larger common plan of development or sale must comply with the post-construction requirements detailed in the applicable National Pollutant Discharge Elimination System (NPDES) General permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities issued by the State Water Resources Control Board or the Lahontan Regional Water Quality Control Board (for projects in the Lake Tahoe Hydrologic Unit).

The NPDES permits require postconstruction runoff (post-project hydrology) to match the preconstruction runoff (pre-project hydrology) with the installation of postconstruction stormwater management measures. The NPDES permits emphasize runoff reduction through on-site stormwater use, interception, evapotranspiration, and infiltration through nonstructural controls, such as Low Impact Development (LID) practices, and conversation design measures. Stormwater volume that cannot be addressed using nonstructural practices is required to be captured in structural practices and be approved by the enforcing agency.

Refer to the current applicable permits on the State Water Resources Control Board website at: www.waterboards.ca.gov/constructionstormwater. Consideration to the stormwater runoff management measures should be given during the initial design process for appropriate integration into site development.

5.106.4 BICYCLE PARKING. For buildings within the authority of California Building Standards Commission as specified in Section 103, comply with Section 5.106.4.1. For buildings within the authority of the Division of the State Architect pursuant to Section 105, comply with Section 5.106.4.2

5.106.4.1 Bicycle parking. [BSC-CG] Comply with Sections 5.106.4.1.1 and 5.106.4.1.2; or meet the applicable local ordinance, whichever is stricter.

5.106.4.1.1 Short-term bicycle parking. If the new project or an addition or alteration is anticipated to generate visitor traffic, provide permanently anchored bicycle racks within 200 feet of the visitors' entrance, readily visible to passers-by, for 5% of new visitor motorized vehicle parking spaces being added, with a minimum of one two-bike capacity rack.
Exception: Additions or alterations which add nine or less visitor vehicular parking spaces.

5.106.4.1.2 Long-term bicycle parking. For new buildings with tenant spaces that have 10 or more tenant-occupants, provide secure bicycle parking for 5 percent of the tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility.

5.106.4.1.3 For additions or alterations that add 10 or more tenant-occupant vehicular parking spaces, provide secure bicycle parking for 5 percent of the tenant vehicular parking spaces being added, with a minimum of one bicycle parking facility.

5.106.4.1.4 For new shell buildings in phased projects provide secure bicycle parking for 5 percent of the anticipated tenant-occupant vehicular parking spaces with a minimum of one bicycle parking facility.

5.106.4.1.5 Acceptable bicycle parking facility for Sections 5.106.4.1.2, 5.106.4.1.3, and 5.106.4.1.4 shall be convenient from the street and shall meet one of the following:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; or
3. Lockable, permanently anchored bicycle lockers.

Note: Additional information on recommended bicycle accommodations may be obtained from Sacramento Area Bicycle Advocates.

5.106.4.2 Bicycle parking. [DSA-SS] For public schools and community colleges, comply with Sections 5.106.4.2.1 and 5.106.4.2.2

5.106.4.2.1 Student bicycle parking. Provide permanently anchored bicycle racks conveniently accessed with a minimum of four two-bike capacity racks per new building.
5.106.4.2.2 Staff bicycle parking. Provide permanent, secure bicycle parking conveniently accessed with a minimum of two staff bicycle parking spaces per new building. Acceptable bicycle parking facilities shall be convenient from the street or staff parking area and shall meet one of the following:

1. Covered, lockable enclosures with permanently anchored racks for bicycles;
2. Lockable bicycle rooms with permanently anchored racks; or
3. Lockable, permanently anchored bicycle lockers.

5.106.5.3 Electric vehicle (EV) charging. [N] Construction to provide electric vehicle infrastructure and facilitate electric vehicle charging shall comply with Section 5.106.5.3.1 and shall be provided in accordance with regulations in the California Building Code and the California Electrical Code.

Exceptions:
1. On a case-by-case basis where the local enforcing agency has determined compliance with this section is not feasible based upon one of the following conditions:
   a. Where there is no local utility power supply
   b. Where the local utility is unable to supply adequate power.
   c. Where there is evidence suitable to the local enforcement agency substantiating the local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.
2. Parking spaces accessible only by automated mechanical car parking systems are not required to comply with this code section

5.106.5.3.1 EV capable spaces.
[N] EV capable spaces shall be provided in accordance with Table 5.106.5.3.1 and the following requirements:
1. Raceways complying with the California Electrical Code and no less that 1-inch (25 mm) diameter shall be provided and shall originate at a service panel or a subpanel(s) serving the area, and shall terminate in close proximity to the proposed location of the EV capable and into a suitable listed cabinet, box,enclosure or equivalent. A common raceway may be used to serve multiple EV charging spaces.
2. A service panel or subpanel (s) shall be provided with panel space and electrical load capacity for a dedicated 208/240 volt, 40-ampere minimum branch circuit for each EV capable space, with delivery of 30-ampere minimum to an installed EVSE at each EVCS.
3. The electrical system and any on-site distribution transformers shall have sufficient capacity to supply full rated amperage at each EV capable space.
4. The service panel or subpanel circuit directory shall identify the reserved overcurrent protective devices space(s) as "EV CAPABLE". The raceway termination location shall be permanently and visibly marked as "EV CAPABLE."

Note: A parking space served by electric vehicle supply equipment or designed as a future EV charging space shall count as at least one standard automobile parking space only for the purpose of complying with any applicable minimum parking space requirements established by an enforcement agency. See vehicle Code Section 22511.2 for further details.

TABLE 5.106.5.3.1

TOTAL NUMBER OF ACTUAL PARKING SPACES	NUMBER OF REQUIRED EV CAPABLE SPACES	NUMBER OF EVCS (EV CAPABLE SPACES PROVIDED WITH EVSE)*2
0-9	0	0
10-25	2	0
26-50	8	2
51-75	13	3
76-100	17	4
101-150	25	6
151-200	35	9
201 AND OVER	20% of total*1	25% of EV capable spaces*1

1. Where there is insufficient electrical supply.
2. The number of required EVCS (EV capable spaces provided with EVSE) in column 3 count towards the total number of required EV capable spaces shown in column 2.

5.106.5.3.2 Electric vehicle charging stations (EVCS)
EV capable spaces shall be provided with EVSE to create EVCS in the number indicated in Table 5.106.5.3.1. The EVCS required by Table 5.106.5.3.1 may be provided with EVSE in any combination of Level 2 and Direct Current Fast Charging (DCFC), except that at least one Level 2 EVSE shall be provided.

One EV charger with multiple connectors capable of charging multiple EVs simultaneously shall be permitted if the electrical load capacity required by Section 5.106.5.3.1 for each EV capable space is accumulatively supplied to the EV charger.

The installation of each DCFC EVSE shall be permitted to reduce the minimum number of required EV capable spaces without EVSE by five and reduce proportionally the required electrical load capacity to the service panel or subpanel.

5.106.5.3.3 Use of automatic load management systems (ALMS).
ALMS shall be permitted for EVCS. When ALMS is installed, the required electrical load capacity specified in Section 5.106.5.3.1 for each EVCS may be reduced when serviced by an EVSE controlled by an ALMS. Each EVSE controlled by an ALMS shall deliver a minimum 30 amperes to an EV when charging one vehicle and shall deliver a minimum 3.3 kW while simultaneously charging multiple EVs.

5.106.5.3.4 Accessible EVCS.
When EVSE is installed, accessible EVSC shall be provided in accordance with the *California Building Code*, Chapter 11B, Section 11B-228.3.
Note: For EVCS signs, refer to Caltrans Traffic Operations Policy Directive 13-01 (Zero Emission Vehicle Signs and Pavement Markings) or its successor(s).

5.106.5.4 Electric Vehicle (EV) charging: medium-duty and heavy-duty. [N]
Construction shall comply with section 5.106.5.4.1 to facilitate future installation of electric vehicle supply equipment (EVSE). Construction for warehouses, grocery stores and retail stores with planned off-street loading spaces shall also comply with Section 5.106.5.4.1 for future installation of medium- and heavy-duty EVSE.
Exceptions:
1. On a case-by-case basis where the local enforcing agency has determined compliance with this section is not feasible based upon one of the following conditions:
   a. Where there is no local utility power supply.
   b. Where the local utility is unable to supply adequate power.
   c. Where there is evidence suitable to the local enforcing agency substantiating that additional local utility infrastructure design requirements, directly related to the implementation of Section 5.106.5.3, may adversely impact the construction cost of the project.

When EVSE(s) is/are installed, it shall be in accordance with the *California Building Code*, the *California Electrical Code* and as follows:

5.106.5.4.1 Electric vehicle charging readiness requirements for warehouse, grocery stores and retail stores with planned off-street loading spaces.
[N] In order to avoid future demolition when adding EV charging supply and distribution equipment, spare raceways(s) or busway(s) and adequate capacity for transformers(s), service panels(s) or subpanel(s) shall be installed at the time of construction in accordance with the California Electrical Code. Construction plans and specifications shall include but are not limited to, the following:
1. The transformer, main service equipment and subpanel shall meet the minimum power requirement in Table 5.106.5.4.1 to accommodate the dedicated branch circuits for the future installation of EVSE.
2. The construction documents shall indicate on or more location(s) convenient to the planned offstreet loading space(s) reserved for medium-and heavy-duty ZEV charging cabinets and charging dispensers, and a pathway reserved for routing of conduit from the termination of the raceway(s) or busway(s) to the charging cabinet(s) and dispenser(s) as shown in Table 5.106.5.4.1
3. Raceway(s) or busway(s) originating at a main service panel or a subpanel(s) serving the area where potential future medium-and heavy-duty EVSE will be located and shall terminate in close proximity to the potential future location of the charging equipments for medium- and heavy-duty vehicles.
4. The raceway(s) or busway(s) shall be sufficient size to carry the minimum additional system load to the future location of the charging for medium- and heavy-duty ZEVs as shown in Table 5.106.5.4.1.

TABLE 5.106.5.4.1 RACEWAY CONDUIT AND PANEL POWER REQUIREMENTS FOR MEDIUM- AND HEAVY-DUTY EVSE [N]

BUILDING TYPE	BUILDING SIZE (SQ. FT.)	NUMBER OF OFF-STREET LOADING SPACES	ADDITIONAL CAPACITY REQUIRED (KVA) FOR RACEWAY & BUSWAY AND TRANSFORMER & PANEL
Grocery	10,000 to 90,000	1 or 2	200
		3 or Greater	400
	Greater than 90,000	1 or Greater	400
Retail	10,000 to 135,000	1 or 2	200
		3 or Greater	400
	Greater than 135,000	1 or Greater	400
Warehouse	20,000 to 256,000	1 or 2	200
		3 or Greater	400
	Greater than 256,000	1 or Greater	400

5.106.8 LIGHT POLLUTION REDUCTION. [N]. I Outdoor lighting systems shall be designed and installed to comply with the following:

1. The minimum requirements in the California Energy Code for Lighting Zones 0-4 as defined in Chapter 10, Section 10-114 of the California Administrative Code; and
2. Backlight (B) ratings as defined in IES TM-15-11 (shown in Table A-1 in Chapter 8);
3. Uplight and Glare ratings as defined in California Energy Code (shown in Tables 130.2-A and 130.2-B in Chapter 8) and
4. Allowable BUG ratings not exceeding those shown in Table 5.106.8, [N] or Comply with a local ordinance lawfully enacted pursuant to Section 101.7, whichever is more stringent.

Exceptions: [N]

1. Luminaires that qualify as exceptions in Sections 130.2 (b) and 140.7 of the California Energy Code.
2. Emergency lighting.
3. Building facade meeting the requirements in Table 140.7-B of the California Energy Code, Part 6.
4. Custom lighting features as allowed by the local enforcing agency, as permitted by Section 101.8 Alternate materials, designs and methods of construction.
5. Luminaires with less than 6,200 initial luminaire lumens.

TABLE 5.106.8 [N] MAXIMUM ALLOWABLE BACKLIGHT, UPLIGHT AND GLARE (BUG) RATINGS 1,2

ALLOWABLE RATING	LIGHTING ZONE LZ0	LIGHTING ZONE LZ1	LIGHTING ZONE LZ2	LIGHTING ZONE LZ3	LIGHTING ZONE LZ4
MAXIMUM ALLOWABLE BACKLIGHT RATING 3					
Luminaire greater than 2 mounting heights (MH) from property line	N/A	No Limit	No Limit	No Limit	No Limit
Luminaire back hemisphere is 1-2 MH from property line	N/A	B2	B3	B4	B4
Luminaire back hemisphere is 0.5-1 MH from property line	N/A	B1	B2	B3	B3
Luminaire back hemisphere is less than 0.5 MH from property line	N/A	B0	B0	B1	B2
MAXIMUM ALLOWABLE UPLIGHT RATING (U)					
For area lighting 3	N/A	U0	U0	U0	U0
For all other outdoor lighting,including decorative luminaires	N/A	U1	U2	U3	UR
MAXIMUM ALLOWABLE GLARE RATING 4 (G)					
MAXIMUM ALLOWABLE GLARE RATING 4 (G)	N/A	G1	G2	G3	G4
MAXIMUM ALLOWABLE GLARE RATING 4 (G)	N/A	G0	G1	G1	G2
MAXIMUM ALLOWABLE GLARE RATING 4 (G)	N/A	G0	G0	G1	G1
MAXIMUM ALLOWABLE GLARE RATING 4 (G)	N/A	G0	G0	G0	G1

1. IESNA Lighting Zones 0 and 5 are not applicable; refer to Lighting Zones as defined in the *California Energy Code* and Chapter 10 of the *California Administrative Code.*

2. For property lines that abut public walkways, bikeways, plazas and parking lots, the property line may be considered to be 5 feet beyond the actual property line for purpose of determining compliance with this section. For property lines that abut public roadways and public transit corridors, the property line may be considered to be the centerline of the public roadway or public transit corridor for the purpose of determining compliance with this section.

3. General lighting luminaires in areas such as outdoor parking, sales or storage lots shall meet these reduced ratings. Decorative luminaries located in these areas shall meet *U*-value limits for "all other outdoor lighting"

5.106.8.1 Facing- Backlight
Luminaires within 2MH of a property line shall be oriented so that the nearest property line is behind the fixture, and shall comply with the backlight rating specified in Table 5.106.8 based on the lighting zone and distance to the nearest point of that property line.
Exception: Corners. If two property lines (or two segments of the same property line) have equidistant point to the luminaire, then the luminaire may be oriented so that the intersection of the two lines (the corner) is directly behind the luminaire. The luminaire shall still use the distance to the nearest points(s) on the property lines to determine the required backlight rating.

5.106.8.2 Facing-Glare.
For luminaires covered by 5.106.8.1, if a property line also exists within or extends into the front hemisphere within 2MH of the luminaire then the luminaire shall comply with the more stringent glare rating specified in Table 5.106.8 based on the lighting zone and distance to the nearest point on the nearest property line within the front hemisphere.

Note: [N]
1.See also *California Building Code*, Chapter 12, Section 1205.6 for college campus lighting requirements for parking facilities and walkways.
2.Refer to Chapter 8 (Compliance Forms, Worksheets and Reference Material) for IES TM-15-11 Table A-1, *California Energy Code* Tables 130.2-A and 130.2-B.
3. Refer to the *California Building Code* for requirements for additions and alterations.

5.106.10 GRADING AND PAVING. Construction plans shall indicate how site grading or a drainage system will manage all surface water flows to keep water from entering buildings. Examples of methods to manage surface water include, but are not limited to, the following:

1. Swales.
2. Water collection and disposal systems.
3. French drains.
4. Water retention gardens.
5. Other water measures which keep surface water away from buildings and aid in groundwater recharge.
Exception: Additions and alterations not altering the drainage path.

5.106.12 SHADE TREES [DSA-SS]. Shade Trees shall be planted to comply with Sections 5.106.12.1, 5.106.12.2, and 5.106.12.3. Percentages shown shall be measured at noon on the summer solstice. Landscape irrigation necessary to establish and maintain tree health shall comply with Section 5.304.6.

5.106.12.1 Surface parking areas. Shade tree plantings, minimum #10 container size or equal, shall be installed to provide shade over 50 percent of the parking area within 15 years.

Exceptions: Surface parking area covered by solar photovoltaic shade structures with roofing materials that comply with Table A5.106.11.2.2 in Appendix A5 shall be permitted in whole or in part in lieu of shade tree planting.

5.106.12.2 Landscape areas. Shade tress plantings, minimum #10 container size or equal shall be installed to provide shade of 20% of the landscape area within 15 years.

Exceptions: Playfields for organized sport activity are not included in the total area calculation.

5.106.12.3. Hardscape areas. Shade tree plantings, minimum #10 container size or equal shall be installed to provide shade over 20 percent of the hardscape area within 15 years.

Exceptions:
1. Walks, hardscape areas covered by solar photovoltaic shade structures or shade structures with roofing materials that comply with Table A5.106.11.2.2 in Appendix A5 shall be permitted in whole or in part in lieu of shade tree planting.
2. Designated and marked play areas of organized sport activity are not included in the total area calculation.

DIVISION 5.2 ENERGY EFFICIENCY

SECTION 5.201 GENERAL

5.201.1 Scope [BSC-CG]. *California Energy Code [DSA-SS].* For the purposes of mandatory energy efficiency standards in this code, the California Energy Commission will continue to adopt mandatory building standards.

DIVISION 5.3 WATER EFFICIENCY AND CONSERVATION

SECTION 5.301 GENERAL

5.301.1 Scope. The provisions of this chapter shall establish the means of conserving water use indoors, outdoors and in wastewater conveyance.

SECTION 5.302 DEFINITIONS

5.302.1 Definitions. The following terms are defined in Chapter 2 *(and are included here for reference)*

EVAPOTRANSPIRATION ADJUSTMENT FACTOR (ETAF) [DSA-SS]. An adjustment factor when applied to reference evapotranspiration that adjusts for plant factors and irrigation efficiency, which ae two major influences on the amount of water that needs to be applied to the landscape.

FOOTPRINT AREA [DSA-SS]. The total area of the furthest exterior wall of the structure projected to natural grade, not including exterior areas such as stairs, covered walkways, patios and decks.

METERING FAUCET. A self-closing faucet that dispenses a specific volume of water for each actuation cycle. The volume or cycle duration can be fixed or adjustable.

GRAYWATER. Pursuant to Health and Safety Code Section 17922.12, "graywater" means untreated wastewater that has not been contaminated by any toilet discharge, has not been affected by infectious, contaminated, or unhealthy bodily wastes, and does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. "Graywater" includes, but is not limited to wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines and laundry tubs, but does not include waste water from kitchen sinks or dishwashers.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). The California ordinance regulating landscape design, installation and maintenance practices that will ensure commercial, multifamily and other developer installed landscapes greater than 2500 square feet meet an irrigation water budget developed based on landscaped area and climatological parameters.

MODEL WATER EFFICIENT LANDSCAPE ORDINANCE (MWELO). [HCD] The California model ordinance (California Code of Regulations, Title 23, Division 2, Chapter 2.7), regulating landscape design, installation and maintenance practices. Local agencies are required to adopt the updated MWELO, or adopt a local ordinance at least as effective as the MWELO.

POTABLE WATER. Water that is drinkable and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards. See definition in the California Plumbing Code, Part 5.

POTABLE WATER. [HCD] Water that is satisfactory for drinking, culinary, and domestic purposes, and meets the U.S. Environmental Protection Agency (EPA) Drinking Water Standards and the requirements of the Health Authority Having Jurisdiction.

RECYCLED WATER. Water which, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use that would not otherwise occur [Water Code Section 13050 (n)]. Simply put, recycled water is water treated to remove waste matter attaining a quality that is suitable to use the water again.

SUBMETER. [HCD 1] A secondary device beyond a meter that measures water consumption of an individual rental unit within a multiunit residential structure or mixed-use residential and commercial structure. (See Civic Code Section 1954.202 (g) and Water code Section 517 for additional details.)

WATER BUDGET. Is the estimated total landscape irrigation water use which shall not exceed the maximum applied water allowance calculated in accordance with the Department of Water Resources Model Efficient Landscape Ordinance (MWELO).

DISCLAIMER: *THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.*

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2022 CALGREEN REQUIREMENTS - COMMERCIAL

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AIA California 2022 CALIFORNIA GREEN BUILDING STANDARDS CODE

NONRESIDENTIAL MANDATORY MEASURES, SHEET 2 (January 2023)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

SECTION 5.303 INDOOR WATER USE

5.303.1 METERS. Separate submeters or metering devices shall be installed for the uses described in Sections 503.1.1 and 503.1.2.

5.303.1.1 Buildings in excess of 50,000 square feet. Separate submeters shall be installed as follows:

1. For each individual leased, rented or other tenant space within the building projected to consume more than 100 gal/day (380 L/day), including, but not limited to, spaces used for laundry or cleaners, restaurant or food service, medical or dental office, laboratory, or beauty salon or barber shop.
2. Where separate submeters for individual building tenants are unfeasible, for water supplied to the following subsystems:
   a. Makeup water for cooling towers where flow through is greater than 500 gpm (30 L/s).
   b. Makeup water for evaporative coolers greater than 6 gpm (0.04 L/s).
   c. Steam and hot water boilers with energy input more than 500,000 Btu/h (147 kW).

5.303.1.2 Excess consumption. A separate submeter or metering device shall be provided for any tenant within a new building or within an addition that is projected to consume more than 1,000 gal/day.

5.303.3 WATER CONSERVING PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures (water closets and urinals) and fittings (faucets and showerheads) shall comply with the following:

5.303.3.1 Water Closets. The effective flush volume of all water closets shall not exceed 1.28 gallons per flush. Tank-type water closets shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Tank-Type toilets.

Note: The effective flush volume of dual flush toilets is defined as the composite, average flush volume of two reduced flushes and one full flush.

5.303.3.2 Urinals.
5.303.3.2.1 Wall-mounted Urinals. The effective flush volume of wall-mounted urinals shall not exceed 0.125 gallons per flush.

5.303.3.2.2 Floor-mounted Urinals. The effective flush volume of floor-mounted or other urinals shall not exceed 0.5 gallons per flush.

5.303.3.3 Showerheads. [BSC-CG]
5.303.3.3.1 Single showerhead. Showerheads shall have a maximum flow rate of not more than 1.8 gallons per minute at 80 psi. Showerheads shall be certified to the performance criteria of the U.S. EPA WaterSense Specification for Showerheads.

5.303.3.3.2 Multiple showerheads serving one shower. When a shower is served by more than one showerhead, the combined flow rate of all the showerheads and/or other shower outlets controlled by a single valve shall not exceed 1.8 gallons per minute at 80 psi, or the shower shall be designed to allow only one shower outlet to be in operation at a time.
Note: A hand-held shower shall be considered a showerhead.

5.303.3.4 Faucets and fountains.

5.303.3.4.1 Nonresidential Lavatory faucets. Lavatory faucets shall have a maximum flow rate of not more than 0.5 gallons per minute at 60 psi.

5.303.3.4.2 Kitchen faucets. Kitchen faucets shall have a maximum flow rate of not more than 1.8 gallons per minute at 60 psi. Kitchen faucets may temporarily increase the flow above the maximum rate, but not to exceed 2.2 gallons per minute at 60 psi, and must default to a maximum flow rate of 1.8 gallons per minute at 60 psi.

5.303.3.4.3 Wash fountains. Wash fountains shall have a maximum flow rate of not more than1.8 gallons per minute/20 [rim space (inches) at 60 psi].

5.303.3.4.4 Metering faucets. Metering faucets shall not deliver more than 0.20 gallons per cycle.

5.303.3.4.5 Metering faucets for wash fountains. Metering faucets for wash fountains shall have a maximum flow rate of not more than 0.20 gallons per minute/20 [rim space (inches) at 60 psi].

Note: Where complying faucets are unavailable, aerators or other means may be used to achieve reduction.

5.303.3.4.6 Pre-rinse spray value
When installed, shall meet the requirements in the *California Code of Regulations*, Title 20 (Appliance Efficiency Regulations), Section 1605.1 (h)(4) Table H-2, Section 1605.3 (h)(4)(A), and Section 1607 (d)(7), and shall be equipped with an integral automatic shutoff.

FOR REFERENCE ONLY: The following table and code section have been reprinted from the *California Code of Regulations*, Title 20 (Appliance Efficiency Regulations), Section 1605.1 (h)(4) and Section 1605.3 (h)(4)(A).

TABLE H-2

STANDARDS FOR COMMERCIAL PRE-RINSE SPRAY VALUES MANUFACTURED ON OR AFTER JANUARY 28, 2019

PRODUCT CLASS [spray force in ounce force (ozf)]	MAXIMUM FLOW RATE (gpm)
Product Class 1 (≤ 5.0 ozf)	1.00
Product Class 2 (> 5.0 ozf and ≤ 8.0 ozf)	1.20
Product Class 3 (> 8.0 ozf)	1.28

5.303.4 COMMERCIAL KITCHEN EQUIPMENT.

5.303.4.1 Food Waste Disposers. Disposers shall either modulate the use of water to no more than 1 gpm when the disposer is not in use (not actively grinding food waste/no-load) or shall automatically shut off after no more than 10 minutes of inactivity. Disposers shall use no more than 8 gpm of water.
Note: This code section does not affect local jurisdiction authority to prohibit or require disposer installation.

5.303.5 AREAS OF ADDITION OR ALTERATION. For those occupancies within the authority of the California Building Standards Commission as specified in Section 103, the provisions of Section 5.303.3 and 5.303.4 shall apply to new fixtures in additions or areas of alteration to the building.

5.303.6 STANDARDS FOR PLUMBING FIXTURES AND FITTINGS. Plumbing fixtures and fittings shall be installed in accordance with the *California Plumbing Code*, and shall meet the applicable standards referenced in Table 1701.1 of the *California Plumbing Code* and in Chapter 6 of this code.

SECTION 5.304 OUTDOOR WATER USE

5.304.1 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS. Nonresidential developments shall comply with a local water efficient landscape ordinance or the current California Department of Water Resources' Model Water Efficient Landscape Ordinance (MWELO), whichever is more stringent.

Notes:
1. The Model Water Efficient Landscape Ordinance (MWELO) is located in the California Code of Regulations, Title 23, Chapter 2.7, Division 2.
2. MWELO and supporting documents, including a water budget calculator, are available at: https://www.water.ca.gov/.

5.304.6 OUTDOOR POTABLE WATER USE IN LANDSCAPE AREAS. For public schools and community colleges, landscape projects as described in Sections 5.304.6.1 and 5.304.6.2 shall comply with the California Department of Water Resources Model Water Efficient Landscape Ordinance (MWELO) commencing with Section 490 of Chapter 2.7, Division 2, Title 23, *California Code of Regulations*, except that the evapotranspiration adjustment factor (ETAF) shall be 0.65 with an additional water allowance for special landscape areas (SLA) of 0.35.

Exception: Any project with an aggregate landscape area of 2,500 square feet or less may comply with the prescriptive measures contained in Appendix D of the MWELO.

5.304.6.1 Newly constructed landscapes. New construction projects with an aggregate landscape area equal to or greater than 500 square feet.

5.304.6.2 Rehabilitated landscapes. Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 1,200 square feet.

DIVISION 5.4 MATERIAL CONSERVATION AND RESOURCE EFFICIENCY

SECTION 5.401 GENERAL

5.401.1 SCOPE. The provisions of this chapter shall outline means of achieving material conservation and resource efficiency through protection of buildings from exterior moisture, construction waste diversion, employment of techniques to reduce pollution through recycling of materials, and building commissioning or testing and adjusting.

SECTION 5.402 DEFINITIONS

5.402.1 DEFINITIONS. The following terms are defined in Chapter 2 *(and are included here for reference)*

ADJUST. To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

BALANCE. To proportion flows within the distribution system, including sub-mains, branches and terminals, according to design quantities.

BUILDING COMMISSIONING. A systematic quality assurance process that spans the entire design and construction process, including verifying and documenting that building systems and components are planned, designed, installed, tested, operated and maintained to meet the owner's project requirements.

ORGANIC WASTE. Food waste, green waste, landscape and pruning wste, nonhazardous wood waste, and food soiled paper waste that is mixed in with food waste.

TEST. A procedure to determine quantitative performance of a system or equipment

SECTION 5.407 WATER RESISTANCE AND MOISTURE MANAGEMENT

5.407.1 WEATHER PROTECTION. Provide a weather-resistant exterior wall and foundation envelope as required by California Building Code Section 1402.2 (Weather Protection), manufacturer's installation instructions or local ordinance, whichever is more stringent.

5.407.2 MOISTURE CONTROL. Employ moisture control measures by the following methods.

5.407.2.1 Sprinklers. Design and maintain landscape irrigation systems to prevent spray on structures.

5.407.2.2 Entries and openings. Design exterior entries and/or openings subject to foot traffic or wind-driven rain to prevent water intrusion into buildings as follows:

5.407.2.2.1 Exterior door protection. Primary exterior entries shall be covered to prevent water intrusion by using nonabsorbent floor and wall finishes within at least 2 feet around and perpendicular to such openings plus at least one of the following:

1. An installed awning at least 4 feet in depth.
2. The door is protected by a roof overhang at least 4 feet in depth.
3. The door is recessed at least 4 feet.
4. Other methods which provide equivalent protection.

5.407.2.2.2 Flashing. Install flashings integrated with a drainage plane.

SECTION 5.408 CONSTRUCTION WASTE REDUCTION, DISPOSAL AND RECYCLING

5.408.1 CONSTRUCTION WASTE MANAGEMENT. Recycle and/or salvage for reuse a minimum of 65% of the non-hazardous construction and demolition waste in accordance with Section 5.408.1.1, 5.408.1.2 or 5.408.1.3; or meet a local construction and demolition waste management ordinance, whichever is more stringent.

5.408.1.1 Construction waste management plan. Where a local jurisdiction does not have a construction and demolition waste management ordinance, submit a construction waste management plan that:

1. Identifies the construction and demolition waste materials to be diverted from disposal by efficient usage, recycling, reuse on the project or salvage for future use or sale.
2. Determines if construction and demolition waste materials will be sorted on-site (source-separated) or bulk mixed (single stream).
3. Identifies diversion facilities where construction and demolition waste material collected will be taken.
4. Specifies that the amount of construction and demolition waste materials diverted shall be calculated by weight or volume, but not by both.

5.408.1.2 Waste Management Company. Utilize a waste management company that can provide verifiable documentation that the percentage of construction and demolition waste material diverted from the landfill complies with this section.

Note: The owner or contractor shall make the determination if the construction and demolition waste material will be diverted by a waste management company.

Exceptions to Sections 5.408.1.1 and 5.408.1.2:

1. Excavated soil and land-clearing debris.
2. Alternate waste reduction methods developed by working with local agencies if diversion or recycle facilities capable of compliance with this item do not exist.
3. Demolition waste meeting local ordinance or calculated in consideration of local recycling facilities and markets.

5.408.1.3 Waste stream reduction alternative. The combined weight of new construction disposal that does not exceed two pounds per square foot of building area may be deemed to meet the 65% minimum requirement as approved by the enforcing agency.

5.408.1.4 Documentation. Documentation shall be provided to the enforcing agency which demonstrates compliance with Sections 5.408.1.1, through 5.408.1.3. The waste management plan shall be updated as necessary and shall be accessible during construction for examination by the enforcing agency.

Notes:

1. Sample forms found in "A Guide to the California Green Building Standards Code (Nonresidential)" located www.dgs.ca.gov/BSC/Resources/Page-Content/Building-Standards-Commission-Resources-List-Folder/CALGreen may be used to assist in documenting compliance with the waste management plan.
2. Mixed construction and demolition debris processors can be located at the California Department of Resources Recycling and Recovery (CalRecycle).

5.408.2 UNIVERSAL WASTE. [A] Additions and alterations to a building or tenant space that meet the scoping provisions in Section 301.3 for nonresidential additions and alterations, shall require verification that Universal Waste items such as fluorescent lamps and ballast and mercury containing thermostats as well as other California prohibited Universal Waste materials are disposed of properly and are diverted from landfills. A list of prohibited Universal Waste materials shall be included in the construction documents.

Note: Refer to the Universal Waste Rule link at: http://www.dtsc.ca.gov/universalwaste/

5.408.3 EXCAVATED SOIL AND LAND CLEARING DEBRIS. 100 percent of trees, stumps, rocks and associated vegetation and soils resulting primarily from land clearing shall be reused or recycled. For a phased project, such material may be stockpiled on site until the storage site is developed.

Exception: Reuse, either on or off-site, of vegetation or soil contaminated by disease or pest infestation.

Notes:

1. If contamination by disease or pest infestation is suspected, contact the County Agricultural Commissioner and follow its direction for recycling or disposal of the material.
2. For a map of know pest and/or disease quarantine zones, consult with the California Department of Food and Agriculture. (www.cdfa.ca.gov)

SECTION 5.410 BUILDING MAINTENANCE AND OPERATIONS

5.410.1 RECYCLING BY OCCUPANTS. Provide readily accessible areas that serve the entire building and are identified for the depositing, storage and collection of non-hazardous materials for recycling, including (at a minimum) paper, corrugated cardboard, glass, plastics, organic waste, and metals or meet a lawfully enacted local recycling ordinance, if more restrictive.

Exception: Rural jurisdictions that meet and apply for the exemption in Public Resources Code 42649.82 (a)(2)(A) et seq. shall also be exempt from the organic waste portion of this section.

5.410.1.1 Additions. All additions conducted within a 12-month period under single or multiple permits, resulting in an increase of 30% or more in floor area, shall provide recycling areas on site.

Exception: Additions within a tenant space resulting in less than a 30% increase in the tenant space floor area.

5.410.1.2 Sample ordinance. Space allocation for recycling areas shall comply with Chapter 18, Part 3, Division 30 of the *Public Resources Code*. Chapter 18 is known as the California Solid Waste Reuse and Recycling Access Act of 1991 (Act).

Note: A sample ordinance for use by local agencies may be found in Appendix A of the document at the CalRecycle's web site.

5.410.2 COMMISSIONING. [N] New buildings 10,000 square feet and over. For new buildings 10,000 square feet and over, building commissioning shall be included in the design and construction processes of the building project to verify that the building systems and components meet the owner's or owner representative's project requirements. Commissioning shall be performed in accordance with this section by trained personnel with experience on projects of comparable size and complexity. For I-occupancies that are not regulated by OSHPD or for I-occupancies and L-occupancies that are not regulated y the California Energy Code Section 100.0 Scope, all requirements in Sections 5.410.2 through 5.410.2.6 shall apply.

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting systems and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements

Commissioning requirements shall include:

1. Owner's or Owner representative's project requirements.
2. Basis of design.
3. Commissioning measures shown in the construction documents.
4. Commissioning plan.
5. Functional performance testing.
6. Documentation and training.
7. Commissioning report.

Exceptions:

1. Unconditioned warehouses of any size.
2. Areas less than 10,000 square feet used for offices or other conditioned accessory spaces within unconditioned warehouses.
3. Tenant improvements less than 10,000 square feet as described in Section 303.1.1.
4. Open parking garages of any size, or open parking garage areas, of any size, within a structure.

Note: For the purposes of this section, unconditioned shall mean a building, area, or room which does not provide heating and air conditioning.

Informational Notes:

1. IAS AC 476 is an accreditation criteria for organizations providing training and/or certification of commissioning personnel. AC 476 is available to the Authority Having Jurisdiction as a reference for qualification of commissioning personnel. AC 476 des not certify individuals to conduct functional performance tests or to adjust and balance systems.
2. Functional performance testing for heating, ventilation, air conditioning systems and lighting controls must be performed in compliance with the *California Energy Code*.

5.410.2.1 Owner's or Owner Representative's Project Requirements (OPR). [N] The expectations and requirements of the building appropriate to its phase shall be documented before the design phase of the project begins. This documentation shall include the following:

1. Environmental and sustainability goals.
2. Building sustainable goals.
3. Indoor environmental quality requirements.
4. Project program, including facility functions and hours of operation, and need for after hours operation.
5. Equipment and systems expectations.
6. Building occupant and operation and maintenance (O&M) personnel expectations.

5.410.2.2 Basis of Design (BOD). [N] A written explanation of how the design of the building systems meets the OPR shall be completed at the design phase of the building project. The Basis of Design document shall cover the following systems:

1. Renewable energy systems.
2. Landscape irrigation systems.
3. Water reuse system.

5.410.2.3 Commissioning plan. [N] Prior to permit issuance a commissioning plan shall be completed to document how the project will be commissioned. The commissioning plan shall include the following:

1. General project information.
2. Commissioning goals.
3. Systems to be commissioned. Plans to test systems and components shall include:
   a. An explanation of the original design intent.
   b. Equipment and systems to be tested, including the extent of tests.
   c. Functions to be tested.
   d. Conditions under which the test shall be performed.
   e. Measurable criteria for acceptable performance.
4. Commissioning team information.
5. Commissioning process activities, schedules and responsibilities. Plans for the completion of commissioning shall be included.

5.410.2.4 Functional performance testing. [N] Functional performance tests shall demonstrate the correct installation and operation of each component, system and system-to-system interface in accordance with the approved plans and specifications. Functional performance testing reports shall contain information addressing each of the building components tested, the testing methods utilized, and include any readings and adjustments made.

5.410.2.5 Documentation and training. [N] A Systems Manual and Systems Operations Training are required, including Occupational Safety and Health Act (OSHA) requirements in *California Code of Regulations* (CCR), Title 8, Section 5142, and other related regulations.

5.410.2.5.1 Systems manual. [N] Documentation of the operational aspects of the building shall be completed within the systems manual and delivered to the building owner or representative. The systems manual shall include the following:

1. Site information, including facility description, history and current requirements.
2. Site contact information.
3. Basic operations and maintenance, including general site operating procedures, basic troubleshooting, recommended maintenance requirements, site events log.
4. Major systems.
5. Site equipment inventory and maintenance notes.
6. A copy of verifications required by the enforcing agency or this code.
7. Other resources and documentation, if applicable.

5.410.2.5.2 Systems operations training. [N] A program for training of the appropriate maintenance staff for each equipment type and/or system shall be developed and documented in the commissioning report and shall include the following:

1. System/equipment overview (what it is, what it does and with what other systems and/or equipment it interfaces).
2. Review and demonstration of servicing/preventive maintenance.
3. Review of the information in the Systems Manual.
4. Review of the record drawings on the system/equipment.

5.410.2.6 Commissioning report. [N] A report of commissioning process activities undertaken through the design and construction phases of the building project shall be completed and provided to the owner or representative.

5.410.4 TESTING AND ADJUSTING. New buildings less than 10,000 square feet. Testing and adjusting of systems shall be required for new buildings less than 10,000 square feet or new systems to serve an addition or alteration subject to Section 303.1.

5.410.4.2 (Reserved)

Note: For energy-related systems under the scope (Section 100) of the California Energy Code, including heating, ventilation, air conditioning (HVAC) systems and controls, indoor lighting system and controls, as well as water heating systems and controls, refer to California Energy Code Section 120.8 for commissioning requirements and Sections 120.5, 120.6, 130.4, and 140.9(b)3 for additional testing requirements of specific systems.

5.410.4.2 Systems. Develop a written plan of procedures for testing and adjusting systems. Systems to be included for testing and adjusting shall include at a minimum, as applicable to the project:

1. Renewable energy systems.
2. Landscape irrigation systems.
3. Water reuse systems.

5.410.4.3 Procedures. Perform testing and adjusting procedures in accordance with manufacturer's specifications and applicable standards on each system.

5.410.4.3.1 HVAC balancing. In addition to testing and adjusting, before a new space-conditioning system serving a building or space is operated for normal use, the system shall be balanced in accordance with the procedures defined by the Testing Adjusting and Balancing Bureau National Standards; the National Environmental Balancing Bureau Procedural Standards; Associated Air Balance Council National Standards or as approved by the enforcing agency.

5.410.4.4 Reporting. After completion of testing, adjusting and balancing, provide a final report of testing signed by the individual responsible for performing these services.

5.410.4.5 Operation and maintenance (O & M) manual. Provide the building owner or representative with detailed operating and maintenance instructions and copies of guaranties/warranties for each system. O & M instructions shall be consistent with OSHA requirements in CCR, Title 8, Section 5142, and other related regulations.

5.410.4.5.1 Inspections and reports. Include a copy of all inspection verifications and reports required by the enforcing agency.

DIVISION 5.5 ENVIRONMENTAL QUALITY

SECTION 5.501 GENERAL

5.501.1 SCOPE. The provisions of this chapter shall outline means of reducing the quantity of air contaminants that are odorous, irritating, and/or harmful to the comfort and well-being of a building's installers, occupants and neighbors.

SECTION 5.502 DEFINITIONS

5.502.1 DEFINITIONS. The following terms are defined in Chapter 2 *(and are included here for reference)*

ARTERIAL HIGHWAY. A general term denoting a highway primarily for through traffic usually on a continuous route.

A-WEIGHTED SOUND LEVEL (dBA). The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made.

1 BTU/HOUR. British thermal units per hour, also referred to as Btu. The amount of heat required to raise one pound of water one degree Fahrenheit per hour, a common measure of heat transfer rate. A ton of refrigeration is 12,000 Btu, the amount of heat required to melt a ton (2,000 pounds) of ice at 32º Fahrenheit.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL). A metric similar to the day-night average sound level (Ldn), except that a 5 decibel adjustment is added to the equivalent continuous sound exposure level for evening hours (7pm to 10pm) in addition to the 10 dB nighttime adjustment used in the Ldn.

COMPOSITE WOOD PRODUCTS. Composite wood products include hardwood plywood, particleboard and medium density fiberboard. "Composite wood products" does not include hardboard, structural plywood, structural panels, structural composite lumber, oriented strand board, glued laminated timber, timber, prefabricated wood I–joists or finger–jointed lumber, all as specified in California Code of Regulations (CCR), Title 17, Section 93120.1(a).

Note: See CCR, Title 17, Section 93120.1.

DAY-NIGHT AVERAGE SOUND LEVEL (Ldn). The A-weighted equivalent continuous sound exposure level for a 24-hour period with a 10 dB adjustment added to sound levels occurring during nighttime hours (10p.m. to 7 a.m.).

DECIBEL (dB). A measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a reference quantity.

ELECTRIC VEHICLE (EV). An automotive-type vehicle for on-road use, such as passenger automobiles, buses, trucks, vans, neighborhood electric vehicles, electric motorcycles, and the like, primarily powered by an electric motor that draws current from a rechargeable storage battery, fuel cell, photovoltaic array, or other source of electric current. Plug-in hybrid electric vehicles (PHEV) are considered electric vehicles. For purposes of the *California Electrical Code*, off-road, self-propelled electric vehicles, such as industrial trucks, hoists, lifts, transports, golf carts, airline ground support equipment, tractors, boats, and the like, are not included.

ELECTRIC VEHICLE CHARGING STATION(S) (EVCS). One or more spaces intended for charging electric vehicles.

ELECTRIC VEHICLE SUPPLY EQUIPMENT (EVSE). The conductors, including the ungrounded, grounded, and equipment grounding conductors and the electric vehicle connectors, attachment plugs, and all other fittings, devices, power outlets, or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle.

ENERGY EQUIVALENT (NOISE) LEVEL (Leq). The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time of period of interest.

EXPRESSWAY. An arterial highway for through traffic which may have partial control of access, but which may or may not be divided or have grade separations at intersections.

FREEWAY. A divided arterial highway with full control of access and with grade separations at intersections.

GLOBAL WARMING POTENTIAL (GWP). The radiative forcing impact of one mass-based unit of a given greenhouse gas relative to an equivalent unit of carbon dioxide over a given period of time. Carbon dioxide is the reference compound with a GWP of one.

GLOBAL WARMING POTENTIAL VALUE (GWP VALUE). A 100-year GWP value published by the Intergovernmental Panel on Climate Change (IPCC) in either its Second Assessment Report (SAR) (IPCC, 1995); or its Fourth Assessment A-3 Report (AR4) (IPCC, 2007). The SAR GWP values are found in column "SAR (100-yr)" of Table 2.14.; the AR4 GWP values are found in column "100 yr" of Table 2.14.

HIGH-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that is: (a) a chlorofluorocarbon, a hdrochlorofluorocarbon, a hydrofluorocarbon, a perfluorocarbon, or any compound or blend of compounds, with a GWP value equal to or greater than 150, or (B) any ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009).

LONG RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.5 times the pipe diameter.

LOW-GWP REFRIGERANT. A compound used as a heat transfer fluid or gas that: (A) has a GWP value less than 150, and (B) is not an ozone depleting substance as defined in Title 40 of the Code of Federal Regulations, Part 82, sec.82.3 (as amended March 10, 2009).

MERV. Filter minimum efficiency reporting value, based on ASHRAE 52.2–1999.

MAXIMUM INCREMENTAL REACTIVITY (MIR). The maximum change in weight of ozone formed by adding a compound to the "Base REactive Organic Gas (ROG) Mixture" per weight of compound added, expressed to hundredths of a gram (g O^3/g ROG).

PRODUCT-WEIGHTED MIR (PWMIR). The sum of all weighted-MIR for all ingredients in a product subject to this article. The PWMIR is the total product reactivity expressed to hundredths of a gram of ozone formed per gram of product (excluding container and packaging).

PSIG. Pounds per square inch, guage.

REACTIVE ORGANIC COMPOUND (ROC). Any compound that has the potential, once emitted, to contribute to ozone formation in the troposphere.

SCHRADER ACCESS VALVES. Access fittings with a valve core installed.

SHORT RADIUS ELBOW. Pipe fitting installed between two lengths of pipe or tubing to allow a change of direction, with a radius 1.0 times the pipe diameter.

SUPERMARKET. For the purposes of Section 5.508.2, a supermarket is any retail food facility with 8,000 square feet or more conditioned area, and that utilizes either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units.

VOC. A volatile organic compound broadly defined as a chemical compound based on carbon chains or rings with vapor pressures greater than 0.1 millimeters of mercury at room temperature. These compounds typically contain hydrogen and may contain oxygen, nitrogen and other elements. See CCR Title 17, Section 94508(a)

Note: Where specific regulations are cited from different agencies such as SCAQMD, ARB, etc., the VOC definition included in that specific regulation is the one that prevails for the specific measure in question.

SECTION 5.503 FIREPLACES

5.503.1 FIREPLACES. Install only a direct-vent sealed-combustion gas or sealed wood-burning fireplace, or a sealed woodstove or pellet stove, and refer to residential requirements in the California Energy Code, Title 24, Part 6, Subchapter 7, Section 150. Woodstoves, pellet stoves and fireplaces shall comply with applicable local ordinances.

5.503.1.1 Woodstoves. Woodstoves and pellet stoves shall comply with U.S. EPA New Source Performance Standards (NSPS) emission limits as applicable, and shall have a permanent label indicating they are certified to meet the emission limits.

SECTION 5.504 POLLUTANT CONTROL

5.504.1 TEMPORARY VENTILATION. The permanent HVAC system shall only be used during construction if necessary to condition the building or areas of addition or alteration within the required temperature range for material and equipment installation. If the HVAC system is used during construction, use return air filters with a Minimum Efficiency Reporting Value (MERV) of 8, based on ASHRAE 52.2-1999, or an average efficiency of 30% based on ASHRAE 52.1-1992. Replace all filters immediately prior to occupancy, or, if the building is occupied during alteration, at the conclusion of construction.

5.504.3 Covering of duct openings and protection of mechanical equipment during construction. At the time of rough installation and during storage on the construction site until final startup of the heating, cooling and ventilation equipment, all duct and other related air distribution component openings shall be covered with tape, plastic, sheetmetal or other methods acceptable to the enforcing agency to reduce the amount of dust, water and debris which may enter the system.

DISCLAIMER: *THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT, INCLUDING VERIFICATION WITH THE FULL CODE.*

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PW-23-01

BID SET 06.03.25

1 REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

2022 CALGREEN REQUIREMENTS - COMMERCIAL

SHEET
G2-02

6/26/2025 4:39:27 PM

2022 CALIFORNIA GREEN BUILDING STANDARDS CODE
NONRESIDENTIAL MANDATORY MEASURES, SHEET 3 (January 2023)

Y = YES
N/A = NOT APPLICABLE
RESPON. PARTY = RESPONSIBLE PARTY (ie: ARCHITECT, ENGINEER, OWNER, CONTRACTOR, INSPECTOR ETC.)

5.504.4 FINISH MATERIAL POLLUTANT CONTROL. Finish materials shall comply with Sections 5.504.4.1 through 5.504.4.6.

5.504.4.1 Adhesives, sealants and caulks. Adhesives, sealants, and caulks used on the project shall meet the requirements of the following standards:
1. Adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers and caulks shall comply with local or regional air pollution control or air quality management district rules where applicable, or SCAQMD Rule 1168 VOC limits, as shown in Tables 5.504.4.1 and 5.504.4.2. Such products also shall comply with the Rule 1168 prohibition on the use of certain toxic compounds (chloroform, ethylene dichloride, methylene chloride, perchloroethylene and trichloroethylene), except for aerosol products as specified in subsection 2, below.

2. Aerosol adhesives, and smaller unit sizes of adhesives, and sealant or caulking compounds (in units of product, less packaging, which do not weigh more than one pound and do not consist of more than 16 fluid ounces) shall comply with statewide VOC standards and other requirements, including prohibitions on use of certain toxic compounds, of *California Code of Regulations*, Title 17, commencing with Section 94507.

TABLE 5.504.4.1 - ADHESIVE VOC LIMIT[1,2]

Less Water and Less Exempt Compounds in Grams per Liter

ARCHITECTURAL APPLICATIONS	CURRENT VOC LIMIT
INDOOR CARPET ADHESIVES	50
CARPET PAD ADHESIVES	50
OUTDOOR CARPET ADHESIVES	150
WOOD FLOORING ADHESIVES	100
RUBBER FLOOR ADHESIVES	60
SUBFLOOR ADHESIVES	50
CERAMIC TILE ADHESIVES	65
VCT & ASPHALT TILE ADHESIVES	50
DRYWALL & PANEL ADHESIVES	50
COVE BASE ADHESIVES	50
MULTIPURPOSE CONSTRUCTION ADHESIVES	70
STRUCTURAL GLAZING ADHESIVES	100
SINGLE-PLY ROOF MEMBRANE ADHESIVES	250
OTHER ADHESIVES NOT SPECIFICALLY LISTED	50
SPECIALTY APPLICATIONS	
PVC WELDING	510
CPVC WELDING	490
ABS WELDING	325
PLASTIC CEMENT WELDING	250
ADHESIVE PRIMER FOR PLASTIC	550
CONTACT ADHESIVE	80
SPECIAL PURPOSE CONTACT ADHESIVE	250
STRUCTURAL WOOD MEMBER ADHESIVE	140
TOP & TRIM ADHESIVE	250
SUBSTRATE SPECIFIC APPLICATIONS	
METAL TO METAL	30
PLASTIC FOAMS	50
POROUS MATERIAL (EXCEPT WOOD)	50
WOOD	30
FIBERGLASS	80

1. IF AN ADHESIVE IS USED TO BOND DISSIMILAR SUBSTRATES TOGETHER, THE ADHESIVE WITH THE HIGHEST VOC CONTENT SHALL BE ALLOWED.

2. FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THIS TABLE, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168, www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF

TABLE 5.504.4.2 - SEALANT VOC LIMIT

Less Water and Less Exempt Compounds in Grams per Liter

SEALANTS	CURRENT VOC LIMIT
ARCHITECTURAL	250
MARINE DECK	760
NONMEMBRANE ROOF	300
ROADWAY	250
SINGLE-PLY ROOF MEMBRANE	450
OTHER	420
SEALANT PRIMERS	
ARCHITECTURAL	
NONPOROUS	250
POROUS	775
MODIFIED BITUMINOUS	500
MARINE DECK	760
OTHER	750

NOTE: FOR ADDITIONAL INFORMATION REGARDING METHODS TO MEASURE THE VOC CONTENT SPECIFIED IN THESE TABLES, SEE SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 1168.

5.504.4.3 Paints and coatings. Architectural paints and coatings shall comply with VOC limits in Table 1 of the ARB Architectural Coatings Suggested Control Measure, as shown in Table 5.504.4.3, unless more stringent local limits apply. The VOC content limit for coatings that do not meet the definitions for the specialty coatings categories listed in Table 5.504.4.3 shall be determined by classifying the coating as a Flat, Nonflat or Nonflat-High Gloss coating, based on its gloss, as defined in Subsections 4.21, 4.36 and 4.37 of the 2007 California Air Resources Board Suggested Control Measure, and the corresponding Flat, Nonflat or Nonflat-High Gloss VOC limit in Table 5.504.4.3 shall apply.

5.504.4.3.1 Aerosol Paints and coatings. Aerosol paints and coatings shall meet the PWMIR Limits for ROC in Section 94522(a)(3) and other requirements, including prohibitions on use of certain toxic compounds and ozone depleting substances, in Sections 94522(c)(2) and (d)(2) of *California Code of Regulations*, Title 17, commencing with Section 94520; and in areas under the jurisdiction of the Bay Area Air Quality Management District additionally comply with the percent VOC by weight of product limits of Regulation 8 Rule 49.

TABLE 5.504.4.3 - CONT.

GRAMS OF VOC PER LITER OF COATING, LESS WATER & LESS EXEMPT COMPOUNDS

COATING CATEGORY	CURRENT VOC LIMIT
SPECIALTY COATINGS	
ALUMINUM ROOF COATINGS	400
BASEMENT SPECIALTY COATINGS	400
BITUMINOUS ROOF COATINGS	50
BITUMINOUS ROOF PRIMERS	350
BOND BREAKERS	350
CONCRETE CURING COMPOUNDS	350
CONCRETE/MASONRY SEALERS	100
DRIVEWAY SEALERS	50
DRY FOG COATINGS	150
FAUX FINISHING COATINGS	350
FIRE RESISTIVE COATINGS	350
FLOOR COATINGS	100
FORM-RELEASE COMPOUNDS	250
GRAPHIC ARTS COATINGS (SIGN PAINTS)	500
HIGH-TEMPERATURE COATINGS	420
INDUSTRIAL MAINTENANCE COATINGS	250
LOW SOLIDS COATINGS[3]	120
MAGNESITE CEMENT COATINGS	450
MASTIC TEXTURE COATINGS	100
METALLIC PIGMENTED COATINGS	500
MULTICOLOR COATINGS	250
PRETREATMENT WASH PRIMERS	420
PRIMERS, SEALERS, & UNDERCOATERS	100
REACTIVE PENETRATING SEALERS	350
RECYCLED COATINGS	250
ROOF COATINGS	50
RUST PREVENTATIVE COATINGS	250
SHELLACS:	
CLEAR	730
OPAQUE	550
SPECIALTY PRIMERS, SEALERS & UNDERCOATERS	100
STAINS	250
STONE CONSOLIDANTS	450
SWIMMING POOL COATINGS	340
TRAFFIC MARKING COATINGS	100
TUB & TILE REFINISH COATINGS	420
WATERPROOFING MEMBRANES	250
WOOD COATINGS	275
WOOD PRESERVATIVES	350
ZINC-RICH PRIMERS	340

1. GRAMS OF VOC PER LITER OF COATING, INCLUDING WATER & EXEMPT COMPOUNDS

2. THE SPECIFIED LIMITS REMAIN IN EFFECT UNLESS REVISED LIMITS ARE LISTED IN SUBSEQUENT COLUMNS IN THE TABLE.

3. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIFORNIA AIR RESOURCES BOARD, ARCHITECTURAL COATINGS SUGGESTED CONTROL MEASURE, FEB. 1, 2008. MORE INFORMATION IS AVAILABLE FROM THE AIR RESOURCES BOARD.

5.504.4.3.2 Verification. Verification of compliance with this section shall be provided at the request of the enforcing agency. Documentation may include, but is not limited to, the following:
1. Manufacturer's product specification
2. Field verification of on-site product containers

5.504.4.4 Carpet Systems.
All carpet installed in the building interior shall meet the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Version 1.2, January 2017 (Emission testing method for California Specifications 01350).

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.4.1 Carpet cushion. All carpet cushion installed in the building interior shall meet the requirements of the California Department of Public Health,"Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers,"Version 1.2, January 2017 (Emission testing method for California Specifications 01350).

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.4.2 Carpet adhesive. All carpet adhesive shall meet the requirements of Table 5.504.4.1.

5.504.4.5 Composite wood products. Hardwood plywood, particleboard and medium density fiberboard composite wood products used on the interior or exterior of the buildings shall meet the requirements for formaldehyde as specified in ARB's Air Toxics Control Measure (ATCM) for Composite Wood (17 CCR 93120 et seq.). Those materials not exempted under the ATCM must meet the specified emission limits, as shown in Table 5.504.4.5.

5.504.4.5.3 Documentation. Verification of compliance with this section shall be provided as requested by the enforcing agency. Documentation shall include at least one of the following:
1. Product certifications and specifications.
2. Chain of custody certifications.
3. Product labeled and invoiced as meeting the Composite Wood Products regulation (see CCR, Title 17, Section 93120, et seq.)
4. Exterior grade products marked as meeting the PS-1 or PS-2 standards of the Engineered Wood Association, the Australian AS/NZS 2269 or European 636 3S standards.
5. Other methods acceptable to the enforcing agency.

TABLE 5.504.4.5 - FORMALDEHYDE LIMITS[1]

MAXIMUM FORMALDEHYDE EMISSIONS IN PARTS PER MILLION

PRODUCT	CURRENT LIMIT
HARDWOOD PLYWOOD VENEER CORE	0.05
HARDWOOD PLYWOOD COMPOSITE CORE	0.05
PARTICLE BOARD	0.09
MEDIUM DENSITY FIBERBOARD	0.11
THIN MEDIUM DENSITY FIBERBOARD[2]	0.13

1. VALUES IN THIS TABLE ARE DERIVED FROM THOSE SPECIFIED BY THE CALIFORNIA AIR RESOURCES BOARD, AIR TOXICS CONTROL MEASURE FOR COMPOSITE WOOD AS TESTED IN ACCORDANCE WITH ASTM E 1333. FOR ADDITIONAL INFORMATION, SEE CALIFORNIA CODE OF REGULATIONS, TITLE 17, SECTIONS 93120 THROUGH 93120.12.

2. THIN MEDIUM DENSITY FIBERBOARD HAS A MAXIMUM THICKNESS OF 5/16 INCHES (8 MM).

5.504.4.6 Resilient flooring systems. Where resilient flooring is installed, at least 80 percent of floor area receiving resilient flooring shall meet the requirements of the California Department of Public Health,"Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Version 1.2, January 2017 (Emission testing method for California Specifications 01350)

See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.6.1 Verification of compliance. Documentation shall be provided verifying that resilient flooring materials meet the pollutant emission limits.

5.504.4.7 Thermal insulation
Comply with the requirements of the California Department of Public Health, "Standard Method of the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, "Version 1.2, January 1.2, January 2017 (Emission testing method for California Specification 01350).
See California Department of Public Health's website for certification programs and testing labs. https://www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/VOC.aspx#material

5.504.4.7.1 Verification of compliance.
Documentation shall be provided verifying that thermal insulation materials meet the pollutant emission limits.

5.504.4.8 Acoustical ceiling and wall panels.
Comply with the requirements of the California Department of Public Health, "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers, " Version 1.2, January 2017 (Emission testing method for California Specification 01350).
See California Department of Public Health's website for certification programs and testing labs.

5.504.4.8.1 Verification of compliance. Documentation shall be provided verifying that acoustical finish materials meet the pollutant emission limits.

5.504.5.3 Filters. In mechanically ventilated buildings, provide regularly occupied areas of the building with air filtration media for outside and return air that provides at least a Minimum Efficiency Reporting Value (MERV) of 13. MERV 13 filters shall be installed prior to occupancy, and recommendations for maintenance with filters of the same value shall be included in the operation and maintenance manual.

Exceptions: Existing mechanical equipment.

5.504.5.3.1 Labeling. Installed filters shall be clearly labeled by the manufacturer indicating the MERV rating.

5.504.7 ENVIRONMENTAL TOBACCO SMOKE (ETS) CONTROL. Where outdoor areas are provided for smoking, prohibit smoking within 25 feet of building entries, outdoor air intakes and operable windows and within the building as already prohibited by other laws or regulations; or as enforced by ordinances, regulations or policies of any city, county, city and county, California Community College, campus of the California State University, or campus of the University of California, whichever are more stringent. When ordinances, regulations or policies are not in place, post signage to inform building occupants of the prohibitions.

SECTION 5.505 INDOOR MOISTURE CONTROL

5.505.1 INDOOR MOISTURE CONTROL. Buildings shall meet or exceed the provisions of California Building Code, CCR, Title 24, Part 2, Sections 1202 (Ventilation) and Chapter 14 (Exterior Walls). For additional measures, see Section 5.407.2 of this code.

SECTION 5.506 INDOOR AIR QUALITY

5.506.1 OUTSIDE AIR DELIVERY. For mechanically or naturally ventilated spaces in buildings, meet the minimum requirements of Section 120.1 (Requirements For Ventilation) of the *California Energy Code*, or the applicable local code, whichever is more stringent, and Division 1, Chapter 4 of CCR, Title 8.

5.506.2 CARBON DIOXIDE (CO_2) MONITORING. For buildings or additions equipped with demand control ventilation, CO_2 sensors and ventilation controls shall be specified and installed in accordance with the requirements of the California Energy Code, Section 120(c)(4).

5.506.3 Carbon dioxide (CO2) monitoring in classrooms.
(DSA-SS) Each public K-12 school classroom, as listed in Table 120.1-A of the *California Energy Code*, shall be equipped with a carbon dioxide monitor or sensor that meets the following requirements:
1. The monitor or sensor shall be permanently affixed in a tamper-proof manner in each classroom between 3 and 6 feet (914 mm and 1829 mm) above the floor and at least 5 feet (1524 mm) away from door and operable windows.
2. When the monitor or sensor is not integral to an Energy Management Control System (EMCS), the monitor or sensor shall display the carbon dioxide readings on the device. When the sensor is integral to an EMCS, the carbon dioxide readings shall be available to and regularly monitored by facility personnel.
3. A monitor shall provide notification through a visual indicator on the monitor when the carbon dioxide levels in the classroom have exceeded 1,100ppm. A sensor integral to an EMCS shall provide notification to facility personnel through a visual and/or audible indicator when the carbon dioxide levels in the classroom have exceeded 1,100ppm.
4. The monitor or sensor shall measure carbon dioxide levels at minimum 15- minute intervals and shall maintain a record of previous carbon dioxide measurements of not less than 30 days duration.
5. The monitor or sensor used to measure carbon dioxide levels shall have the capacity to measure carbon dioxide levels with a range of 400ppm to 2000ppm or greater.
6. The monitor or sensor shall be certified by the manufacturer to be accurate within 75ppm at 1,000ppm carbon dioxide concentration and shall be certified by the manufacturer to require calibration no more frequently than once every 5 years.

SECTION 5.507 ENVIRONMENTAL COMFORT

5.507.4 ACOUSTICAL CONTROL. Employ building assemblies and components with Sound Transmission Class (STC) values determined in accordance with ASTM E 90 and ASTM E 413, or Outdoor-Indoor Sound Transmission Class (OITC) determined in accordance with ASTM E 1332, using either the prescriptive or performance method in Section 5.507.4.1 or 5.507.4.2.

Exception: Buildings with few or no occupants or where occupants are not likely to be affected by exterior noise, as determined by the enforcement authority, such as factories, stadiums, storage, enclosed parking structures and utility buildings.

Exception: [DSA-SS] For public schools and community colleges, the requirements of this section and all subsections apply only to new construction.

5.507.4.1 Exterior noise transmission, prescriptive method. Wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 in the following locations:

1. Within the 65 CNEL noise contour of an airport.

   Exceptions:

   1. L_{dn} or CNEL for military airports shall be determined by the facility Air Installation Compatible Land Use Zone (AICUZ) plan.
   2. L_{dn} or CNEL for other airports and heliports for which a land use plan has not been developed shall be determined by the local general plan noise element.

2. Within the 65 CNEL or L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway source as determined by the Noise Element of the General Plan.

5.507.4.1.1. Noise exposure where noise contours are not readily available. Buildings exposed to a noise level of 65 dB L_{eq} - 1-hr during any hour of operation shall have building, addition or alteration exterior wall and roof-ceiling assemblies exposed to the noise source meeting a composite STC rating of at least 45 (or OITC 35), with exterior windows of a minimum STC of 40 (or OITC 30).

5.507.4.2 Performance Method. For buildings located as defined in Section 5.507.4.1 or 5.507.4.1.1, wall and roof-ceiling assemblies exposed to the noise source making up the building or addition envelope or altered envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level (Leq-1Hr) of 50 dBA in occupied areas during any hour of operation.

5.507.4.2.1 Site Features. Exterior features such as sound walls or earth berms may be utilized as appropriate to the building, addition or alteration project to mitigate sound migration to the interior.

5.507.4.2.2 Documentation of Compliance. An acoustical analysis documenting complying interior sound levels shall be prepared by personnel approved by the architect or engineer of record.

5.507.4.3 Interior sound transmission. Wall and floor-ceiling assemblies separating tenant spaces and tenant spaces and public places shall have an STC of at least 40.

Note: Examples of assemblies and their various STC ratings may be found at the California Office of Noise Control: www.toolbase.org/PDF/CaseStudies/stc_icc_ratings.pdf.

SECTION 5.508 OUTDOOR AIR QUALITY

5.508.1 Ozone depletion and greenhouse gas reductions. Installations of HVAC, refrigeration and fire suppression equipment shall comply with Sections 5.508.1.1 and 5.508.1.2.

5.508.1.1 Chlorofluorocarbons (CFCs). Install HVAC, refrigeration and fire suppression equipment that do not contain CFCs.

5.508.1.2 Halons. Install HVAC, refrigeration and fire suppression equipment that do not contain Halons.

5.508.2 Supermarket refrigerant leak reduction. New commercial refrigeration systems shall comply with the provisions of this section when installed in retail food stores 8,000 square feet or more conditioned area, and that utilize either refrigerated display cases, or walk-in coolers or freezers connected to remote compressor units or condensing units. The leak reduction measures apply to refrigeration systems containing high-global-warming potential (high-GWP) refrigerants with a GWP of 150 or greater. New refrigeration systems include both new facilities and the replacement of existing refrigeration systems in existing facilities.

Exception: Refrigeration systems containing low-global warming potential (low-GWP) refrigerant with a GWP value less than 150 are not subject to this section. Low-GWP refrigerants are nonozone-depleting refrigerants that include ammonia, carbon dioxide (CO_2), and potentially other refrigerants.

5.508.2.1 Refrigerant piping. Piping compliant with the California Mechanical Code shall be installed to be accessible for leak protection and repairs. Piping runs using threaded pipe, copper tubing with an outside diameter (OD) less than 1/4 inch, flared tubing connections and short radius elbows shall not be used in refrigerant systems except as noted below.

5.508.2.1.1 Threaded pipe. Threaded connections are permitted at the compressor rack.

5.508.2.1.2 Copper pipe. Copper tubing with an OD less than 1/4 inch may be used in systems with a refrigerant charge of 5 pounds or less.

5.508.2.1.2.1 Anchorage. One-fouth-inch OD tubing shall be securely clamped to a rigid base to keep vibration levels below 8 mils.

5.508.2.1.3 Flared tubing connections. Double-flared tubing connections may be used for pressure controls, valve pilot lines and oil.

Exception: Single-flared tubing connections may be used with a multiring seal coated with industrial sealant suitable for use with refrigerants and tightened in accordance with manufacturer's recommendations.

5.508.2.1.4 Elbows. Short radius elbows are only permitted where space limitations prohibit use of long radius elbows.

5.508.2.2 Valves. Valves Valves and fittings shall comply with the *California Mechanical Code* and as follows.

5.508.2.2.1 Pressure relief valves. For vessels containing high-GWP refrigerant, a rupture disc shall be installed between the outlet of the vessel and the inlet of the pressure relief valve.

5.508.2.2.1.1 Pressure detection. A pressure gauge, pressure transducer or other device shall be installed in the space between the rupture disc and the relief valve inlet to indicate a disc rupture or discharge of the relief valve.

5.508.2.2.2 Access valves. Only Schrader access valves with a brass or steel body are permitted for use.

5.508.2.2.2.1 Valve caps. For systems with a refrigerant charge of 5 pounds or more, valve caps shall be brass or steel and not plastic.

5.508.2.2.2.2 Seal caps. If designed for it, the cap shall have a neoprene O-ring in place.

5.508.2.2.2.2.1 Chain tethers. Chain tethers to fit ovr the stem are required for valves designed to have seal caps.

Exception: Valves with seal caps that are not removed from the valve during stem operation.

5.508.2.3 Refrigerated service cases. Refrigerated service cases holding food products containing vinegar and salt shall have evaporator coils of corrosion-resistant material, such as stainless steel; or be coated to prevent corrosion from these substances.

5.508.2.3.1 Coil coating. Consideration shall be given to the heat transfer efficiency of coil coating to maximize energy efficiency.

5.508.2.4 Refrigerant receivers. Refrigerant receivers with capacities greater than 200 pounds shall be fitted with a device tha indicates the level of refrigerant in the receiver.

5.508.2.5 Pressure testing. The system shall be pressure tested during installation prior to evacuation and charging.

5.508.2.5.1 Minimum pressure. The system shall be charged with regulated dry nitrogen and appropriate tracer gas to bring system pressure up to 300 psig minimum.

5.508.2.5.2 Leaks. Check the system for leaks, repair any leaks, and retest for pressure using the same gauge.

5.508.2.5.3 Allowable pressure change. The system shall stand, unaltered, for 24 hours with no more than a +/- one pound pressure change from 300 psig, measured with the same gauge.

5.508.2.6 Evacuation. The system shall be evacuated after pressure testing and prior to charging.

5.508.2.6.1 First vacuum. Pull a system vacuum down to at least 1000 microns (+/- 50 microns), and hold for 30 minutes.

5.508.2.6.2 Second vacuum. Pull a second system vacuum to a minimum of 500 microns and hold for 30 minutes.

5.508.2.6.3 Third vacuum. Pull a third vacuum down to a minimum of 300 microns, and hold for 24 hours with a maximum drift of 100 microns over a 24-hour period.

CHAPTER 7
INSTALLER & SPECIAL INSPECTOR QUALIFICATIONS

702 QUALIFICATIONS

702.1 INSTALLER TRAINING. HVAC system installers shall be trained and certified in the proper installation of HVAC systems including ducts and equipment by a nationally or regionally recognized training or certification program. Uncertified persons may perform HVAC installations when under the direct supervision and responsibility of a person trained and certified to install HVAC systems or contractor licensed to install HVAC systems. Examples of acceptable HVAC training and certification programs include but are not limited to the following:

1. State certified apprenticeship programs.
2. Public utility training programs.
3. Training programs sponsored by trade, labor or statewide energy consulting or verification organizations.
4. Programs sponsored by manufacturing organizations.
5. Other programs acceptable to the enforcing agency.

702.2 SPECIAL INSPECTION [HCD]. When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition to other certifications or qualifications acceptable to the enforcing agency, the following certifications or education may be considered by the enforcing agency when evaluating the qualifications of a special inspector:

1. Certification by a national or regional green building program or standard publisher.
2. Certification by a statewide energy consulting or verification organization, such as HERS raters, building performance contractors, and home energy auditors.
3. Successful completion of a third party apprentice training program in the appropriate trade.
4. Other programs acceptable to the enforcing agency.

Notes:

1. Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.
2. HERS raters are special inspectors certified by the California Energy Commission (CEC) to rate homes in California according to the Home Energy Rating System (HERS).

[BSC-CG] When required by the enforcing agency, the owner or the responsible entity acting as the owner's agent shall employ one or more special inspectors to provide inspection or other duties necessary to substantiate compliance with this code. Special inspectors shall demonstrate competence to the satisfaction of the enforcing agency for the particular type of inspection or task to be performed. In addition, the special inspector shall have a certification from a recognized state, national or international association, as determined by the local agency. The area of certification shall be closely related to the primary job function, as determined by the local agency.

Note: Special inspectors shall be independent entities with no financial interest in the materials or the project they are inspecting for compliance with this code.

703 VERIFICATIONS

703.1 DOCUMENTATION. Documentation used to show compliance with this code shall include but is not limited to, construction documents, plans, specifications, builder or installer certification, inspection reports, or other methods acceptable to the enforcing agency which demonstrate substantial conformance. When specific documentation or special inspection is necessary to verify compliance, that method of compliance will be specified in the appropriate section or identified applicable checklist.

DISCLAIMER: *THIS DOCUMENT IS PROVIDED AND INTENDED TO BE USED AS A MEANS TO INDICATE AREAS OF COMPLIANCE WITH THE CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE. DUE TO THE VARIABLES BETWEEN BUILDING DEPARTMENT JURISDICTIONS, THIS CHECKLIST IS TO BE USED ON AN INDIVIDUAL PROJECT BASIS AND MAY BE MODIFIED BY THE END USER TO MEET THOSE INDIVIDUAL NEEDS. THE END USER ASSUMES ALL RESPONSIBILITY ASSOCIATED WITH THE USE OF THIS DOCUMENT; INCLUDING VERIFICATION WITH THE FULL CODE.*

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CLIENT

CONSULTANT

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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

2022 CALGREEN REQUIREMENTS - COMMERCIAL

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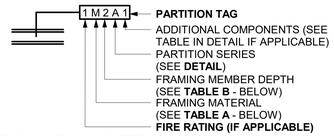


TABLE A- FRAMING MATERIAL SCHEDULE

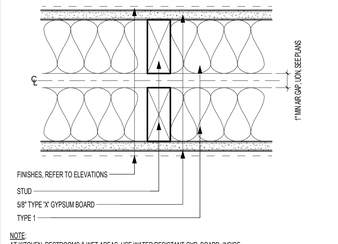
LABEL	MATERIAL TYPE
W	WOOD
M	METAL C-STUD
C	CMU

TABLE B- FRAMING DEPTH SCHEDULE

TAG NUMBER DESIGNATION	MTL STUD DEPTH	MTL C-H STUD DEPTH	WOOD STUD DEPTH	CMU WIDTH
-	**NO FRAMING**			
0	7/8" *FURRING CHANNEL*		N/A	N/A
1	1 5/8"	N/A	3/4"	N/A
2	2 1/2"	2 1/2"	1 1/2"	N/A
3	3 5/8"		2 1/2"	N/A
4	4"	4"	3 1/2"	3 5/8"
6	6"	6"	5 1/2"	5 5/8"
8	8"	N/A	7 1/4"	7 5/8"
10	10"	N/A	9 1/4"	9 5/8"
12	12"	N/A	11 1/4"	11 5/8"

GENERAL NOTES

1. PARTITION TYPES ARE NOT SEQUENTIAL.
2. ALL PARTITION SHEATHING TO BE 5/8" TYPE 'X' GYPSUM BOARD UNLESS OTHERWISE NOTED.
3. ALL PARTITIONS SHALL BE COORDINATED WITH SCHEDULED FINISHES FOR PARTITION LAYOUT AND REQUIRED CLEARANCES.
4. PROVIDE BACKING IN PARTITIONS FOR ARTWORK HANGING AS INDICATED. SEE CONSTRUCTION PLAN(S) AND/ OR INTERIOR ELEVATIONS FOR LOCATIONS.
5. FOR INTERIOR FRAMING LIMITING HEIGHTS REFER TO SSMA TABLES FOR INTERIOR NON-STRUCTURAL NON-COMPOSITE PARTITIONS
6. CONTRACTOR TO RE-CONFIRM STUD SIZING AND SUBMIT SELECTION CRITERIA FOR REVIEW INCLUDING DELINEATION OF SLAB TO UNDERSIDE OF SLAB INFORMATION
7. PARTITION LIMITING HEIGHT HAS BEEN DETERMINED BY A SINGLE MANUFACTURER'S PROPRIETARY STRUCTURAL TABLES. CONTRACTOR SHALL VERIFY ENGINEERED LOAD CAPACITY OF METAL STUDS CONFORMING TO THE REQUIREMENTS OF THE SPECIFICATIONS AND INCLUDE PARTITION LIMITING HEIGHT IN METAL STUD SUBMITTAL.

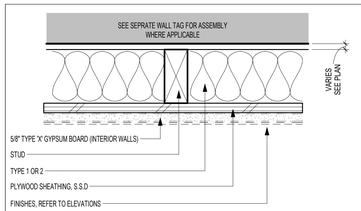


NOTE:
AT KITCHEN, RESTROOMS & WET AREAS, USE WATER RESISTANT GYP. BOARD, INSIDE FACE. REFER TO FINISH PLAN FOR SCHEDULED FINISH TYPE.

TYPE	ADDITION WALL COMPONENTS	COMMENTS
1	SOUND INSULATION	

SCALE: 3" = 1'-0"

C SERIES - PLUMBING CHASE — C

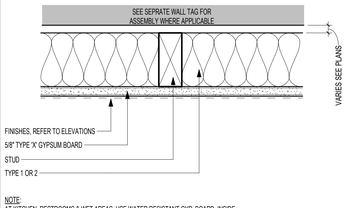


NOTE:
AT KITCHEN, RESTROOMS & WET AREAS, USE WATER RESISTANT GYP. BOARD, INSIDE FACE. REFER TO FINISH PLAN FOR SCHEDULED FINISH TYPE.

TYPE	ADDITION WALL COMPONENTS	COMMENTS
1	THERMAL BATT INSULATION, R-19 MIN.	EXTERIOR WALLS, R-19 INSULATION
2	SOUND INSULATION	

SCALE: 3" = 1'-0"

E SERIES - TYP. FURRED STUD SHEAR WALL — E

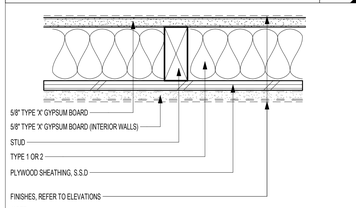


NOTE:
AT KITCHEN, RESTROOMS & WET AREAS, USE WATER RESISTANT GYP. BOARD, INSIDE FACE. REFER TO FINISH PLAN FOR SCHEDULED FINISH TYPE.

TYPE	ADDITION WALL COMPONENTS	COMMENTS
1	THERMAL BATT INSULATION, R-19 MIN.	EXTERIOR WALLS, R-19 INSULATION
2	SOUND INSULATION	
3		

SCALE: 3" = 1'-0"

B SERIES - FURRED STUD WALL — B

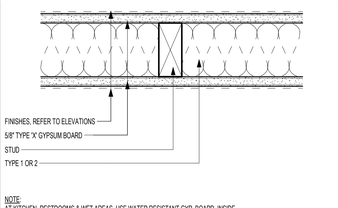


NOTE:
AT KITCHEN, RESTROOMS & WET AREAS, USE WATER RESISTANT GYP. BOARD, INSIDE FACE. REFER TO FINISH PLAN FOR SCHEDULED FINISH TYPE.

TYPE	ADDITION WALL COMPONENTS	COMMENTS
1	THERMAL BATT INSULATION, R-19 MIN.	EXTERIOR WALLS, R-19 INSULATION
2	SOUND INSULATION	

SCALE: 3" = 1'-0"

D SERIES - TYP. STUD SHEAR WALL — D



NOTE:
AT KITCHEN, RESTROOMS & WET AREAS, USE WATER RESISTANT GYP. BOARD, INSIDE FACE. REFER TO FINISH PLAN FOR SCHEDULED FINISH TYPE.

TYPE	ADDITION WALL COMPONENTS	COMMENTS
1	THERMAL BATT INSULATION, R-19 MIN.	EXTERIOR WALLS, R-19 INSULATION
2	SOUND INSULATION	
3		

SCALE: 3" = 1'-0"

A SERIES - TYP. STUD WALL — A

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**

DRAWN **Author**

CHECK **Checker**

WALL PARTITION SCHEDULE

SHEET
G3-01

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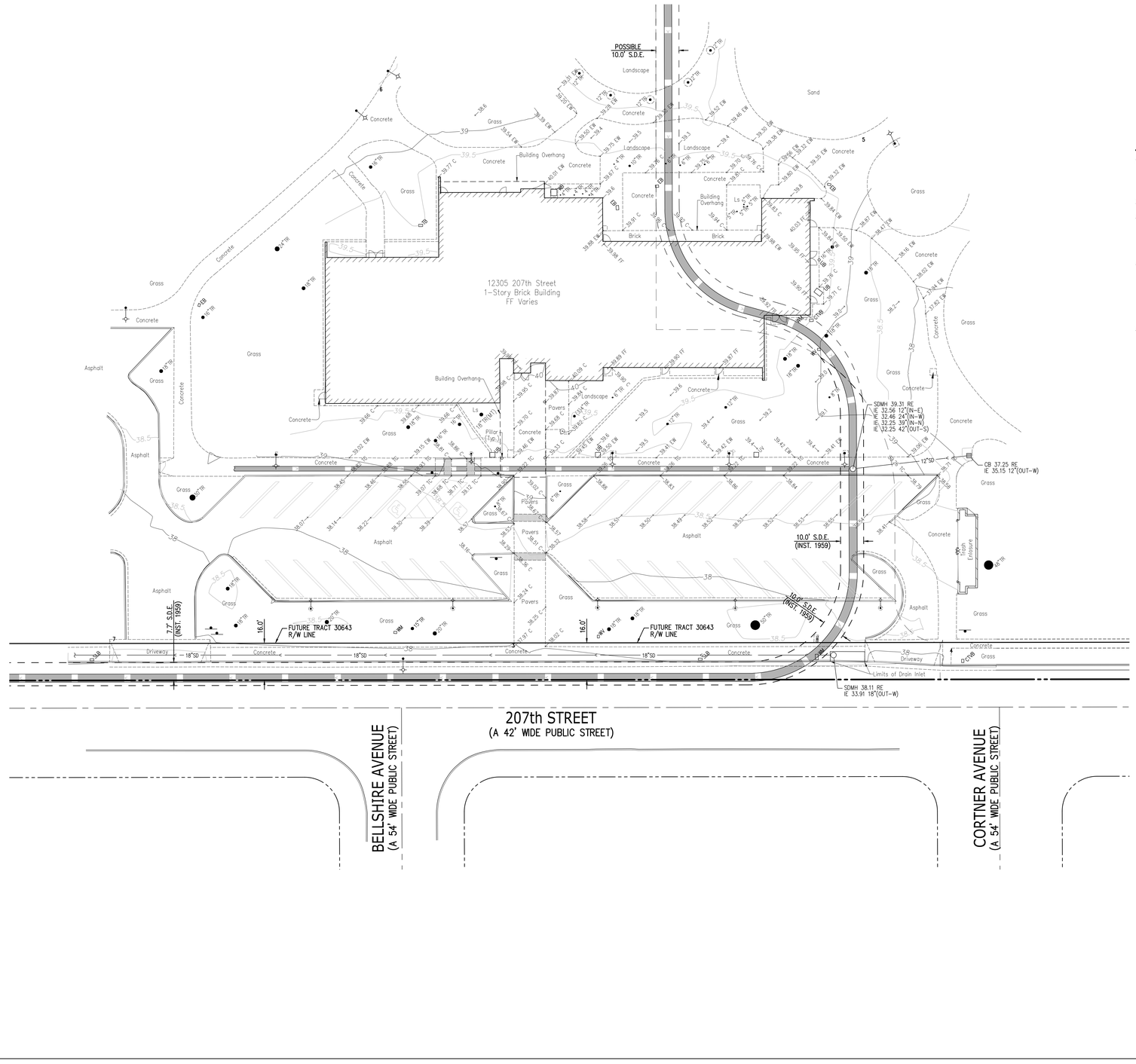

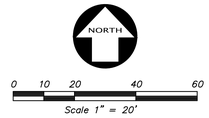

NOTES

1. THIS IS NOT A BOUNDARY SURVEY. NO LIABILITY IS ASSUMED, BY KIER & WRIGHT, FOR THE EXISTENCE OF ANY EASEMENTS, ENCUMBRANCES, DISCREPANCIES IN BOUNDARY, OR TITLE DEFECTS NOT MENTIONED IN SAID DOCUMENTS AND THEREFORE NOT SHOWN ON THIS DRAWING. PROPERTY LINE PLOT ONLY (NO EASEMENTS SHOWN)
2. ALL DISTANCES AND ELEVATIONS SHOWN HEREON ARE IN FEET AND DECIMALS THEREOF.
3. THIS IS NOT A UTILITY SURVEY. PHYSICAL ITEMS SHOWN ON THIS SURVEY ARE LIMITED TO THOSE ITEMS VISIBLE AS OF THE DATE OF THIS SURVEY. SUBSURFACE STRUCTURES, IF ANY, ARE NOT SHOWN. SAID SUBSURFACE OBJECTS MAY INCLUDE, BUT ARE NOT LIMITED TO, CONCRETE FOOTINGS, SLABS, SHORING, STRUCTURAL PILES, UTILITY VAULTS, PIPING, UNDERGROUND TANKS, AND ANY OTHER SUBSURFACE STRUCTURES NOT REVEALED BY A SURFACE INSPECTION.
4. THE SUBJECT PROPERTY IS SHOWN ON THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FIRM) FOR LOS ANGELES COUNTY, CALIFORNIA, MAP NUMBER 06037C1980F FOR COMMUNITY NUMBER 060130 (CITY OF LAKEWOOD), WITH AN EFFECTIVE DATE OF SEPTEMBER 26, 2008, AS BEING LOCATED IN FLOOD ZONE "X (SHADED)". ACCORDING TO FEMA THE DEFINITION OF ZONE "X (SHADED)" IS: AREAS OF 0.2% ANNUAL CHANCE FLOOD; AREAS OF 1% ANNUAL CHANCE FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS OF PROTECTED LEVEES FROM 1% ANNUAL CHANCE FLOOD.
5. BENCHMARK:
   LA COUNTY BENCHMARK Y759A; LACO RDBM TAG IN E CB @ N END C.B. BLOOMFIELD AVE & 285FT N/O C/L LEMMING ST

   ELEVATION: 39.306 FEET (NAVD88, 2013)

LEGEND

- BUILDING LINE
- CENTER LINE
- CONCRETE/BLOCK WALL
- CONCRETE CURB
- CONCRETE CURB & GUTTER
- DRIVEWAY
- EASEMENT LINE
- EDGE OF PAVEMENT
- FENCE LINE
- LOT LINE
- PROPERTY LINE
- SIDEWALK
- 100.00 SPOT ELEVATION
- STORM DRAIN LINE-MANHOLE & CATCH BASIN
- STORM DRAIN LINE-MANHOLE & CATCH BASIN
- STORM DRAIN LINE OVER 24"DIAMETER
- ACCESSIBLE PARKING SYMBOL
- AD AREA DRAIN
- BACKFLOW PREVENTION DEVICE
- ELECTROLIER
- FLAG POLE
- TRAFFIC SIGN
- 12"TR TREE
- UTILITY BOX

ABBREVIATIONS

CTVB	CABLE TELEVISION BOX
DI	DROP INLET
EB	ELECTRIC BOX
EW	EDGE OF WALK
FF	FINISH FLOOR
FL	FLOW LINE
IE	INVERT ELEVATION
LS	LANDSCAPE
R/W	RIGHT OF WAY
RE	RIM ELEVATION
S.D.E.	STORM DRAIN EASEMENT
SDMH	STORM DRAIN MANHOLE
SLB	STREET LIGHT BOX
TB	TELEPHONE BOX
TC	TOP OF CURB
UB	UTILITY BOX
UV	UTILITY VAULT
WB	WATER BOX
WM	WATER METER

12-20-2022
PREPARED BY OR UNDER THE SUPERVISION OF DATE
RYAN M. AMAYA P.L.S. 8134
RAMAYA@KIERWRIGHT.COM

LICENSED LAND SURVEYOR
RYAN M. AMAYA
No. 8134
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CITY OF LAKEWOOD CALIFORNIA
CLIENT

KIER+WRIGHT
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949-508-0202
CONSULTANT

PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
DAVID G. REASLOCK
No. 76867
CIVIL
STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	JM
CHECK	DGR

SHEET NAME
TOPOGRAPHIC SURVEY

SHEET
C1.0

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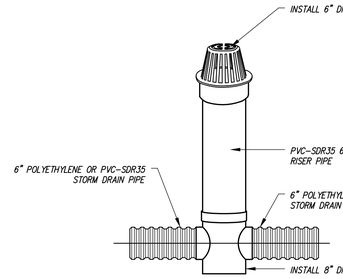
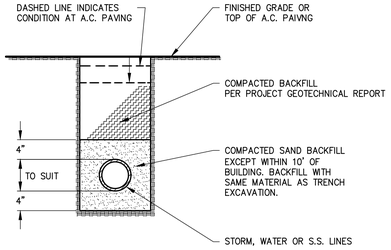


NDS ATRIUM DRAIN

NOT TO SCALE

1



PIPE LINE BACKFILL AND BEDDING DETAIL

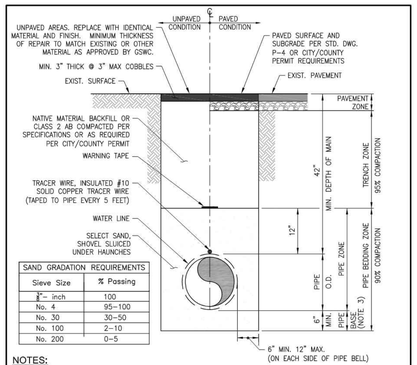
NOT TO SCALE

2

IGBASEDE/MG Iron base tube for in-ground insertion (12 kg, 26 lbs). *Recommended for over 20'x20' (600 x 600cm) umbrellas.

27

- DIMENSIONS OF THE TUBE TO BE CONCRETED (FEMALE SOCKET) HEIGHT 29 CM (11.42")
- DIMENSIONS OF THE TUBE TO BE INSERTED IN TO THE FEMALE SOCKET (MALE SOCKET) HEIGHT 24 CM (9.45")
- DIMENSIONS OF THE PLATE: 180M X 180M (7.09" X 7.09")
- DIMENSIONS OF THE CLUTCH BODY HEIGHT: 29 CM (9.45")
- DIAMETER OF CLUTCH BODY 9 CM (3.54")

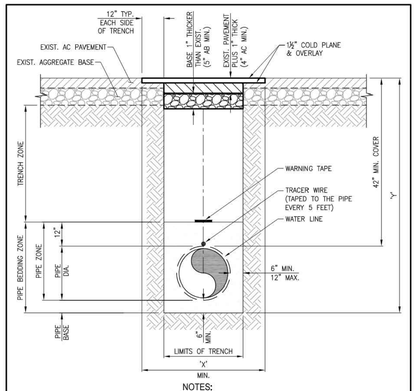


SAND GRADATION REQUIREMENTS	
Sieve Size	% Passing
3/8"- inch	100
No. 4	95–100
No. 30	30–50
No. 100	2–10
No. 200	0–5

NOTES:

1. Trench and pavement per City/County permit requirements or as noted on the drawing and Std. Dwg. P-4.
2. Compaction of backfill per specifications.
3. Pipe base shall be 12" thick where native material has rocks larger than 6 inches in trench bottom.
4. Contractor shall hand excavate "bell hole" for each pipe joint so that the weight of the pipe does not rest on the bell. Contractor to refill and hand-tamp each "bell hole" prior to completing the placement of the bedding.
5. For areas where native soil contains cobbles and large stones (such as Rancho Cordova), place geotechnical filter fabric between Pipe Zone and Trench Zone backfill to prevent migration of rocks to the pipe.
6. Encase D.I.P. and fittings in polyethylene encasement per AWWA Standard C-105, latest edition.
7. Table shows gradation requirements for backfill in Pipe Bedding Zone.
8. Tracer wire shall be tested for electrical continuity by the Contractor prior to acceptance of the project.

APPROVED BY: GSWC STANDARDS COMMITTEE		TITLE: WATER PIPE BEDDING AND TRENCH BACKFILL			
EDC MANAGER 10/16 DATE	Golden State Water Company	SCALE: NONE	DATE: 10/16	REV 1.1	STANDARD DWG NO. P-3

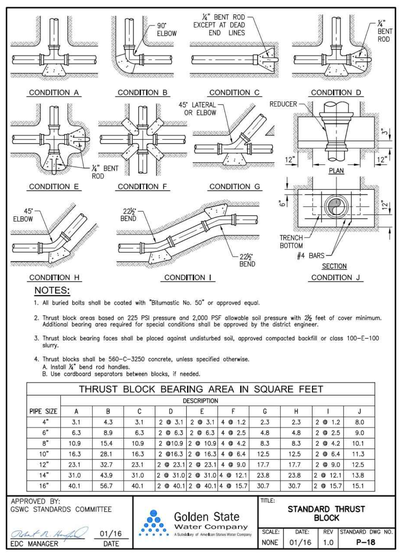


TRENCH DIMENSIONS		
PIPE DIA. (inches)	X DISTANCE (inches)	Y DISTANCE (inches)
6	42	54
8	44	56
12	48	60
16	52	64
24	60	72
30	66	78

NOTES:

1. For specific repaving requirements see permit from City/County.
2. Contractor to clean surfaces that are adjacent new paving and remove rocks, dirt, old paving and/or old concrete that would prevent pavement compaction equipment from keeping contact with the new paving and prevent proper compaction of the new pavement.
3. Temporary paving shall be min. 2"-inches thick and installed over a trench zone section that is level and square.

APPROVED BY: GSWC STANDARDS COMMITTEE		TITLE: TRENCH REPAVING			
EDC MANAGER 10/16 DATE	Golden State Water Company	SCALE: NONE	DATE: 10/16	REV 1.1	STANDARD DWG NO. P-4

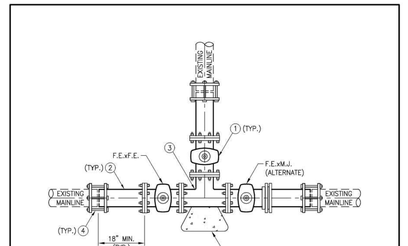


NOTES:

1. All buried bolts shall be coated with "Bitumastic No. 50" or approved equal.
2. Thrust block areas based on 225 PSI pressure and 2,000 PSF allowable soil pressure with 3½ feet of cover minimum. Additional bearing area required for special conditions shall be approved by the district engineer.
3. Thrust block bearing faces shall be placed against undisturbed soil, approved compacted backfill or class 100-E-100 slurry.
4. Thrust blocks shall be 560-C-3250 concrete, unless specified otherwise.
   A. Install ¾" bend rod handles.
   B. Use cardboard separators between blocks, if needed.

THRUST BLOCK BEARING AREA IN SQUARE FEET										
	DESCRIPTION									
PIPE SIZE	A	B	C	D	E	F	G	H	I	J
4"	3.1	4.3	3.1	2 @ 3.1	2 @ 3.1	4 @ 1.2	2.3	2.3	2 @ 1.2	8.0
6"	6.3	8.9	6.3	2 @ 6.3	2 @ 6.3	4 @ 2.5	4.8	4.8	2 @ 2.5	9.0
8"	10.9	15.4	10.9	2 @10.9	2 @ 10.9	4 @ 4.2	8.3	8.3	2 @ 4.2	10.1
10"	16.3	28.1	16.3	2 @16.3	2 @ 16.3	4 @ 6.4	12.5	12.5	2 @ 6.4	11.3
12"	23.1	32.7	23.1	2 @ 23.1	2 @ 23.1	4 @ 9.0	17.7	17.7	2 @ 9.0	12.5
14"	31.0	43.9	31.0	2 @ 31.0	2 @ 31.0	4 @ 12.1	23.8	23.8	2 @ 12.1	13.8
16"	40.1	56.7	40.1	2 @ 40.1	2 @ 40.1	4 @ 15.7	30.7	30.7	2 @ 15.7	15.1

APPROVED BY: GSWC STANDARDS COMMITTEE		TITLE: STANDARD THRUST BLOCK			
EDC MANAGER 01/16 DATE	Golden State Water Company	SCALE: NONE	DATE: 01/16	REV 1.0	STANDARD DWG NO. P-18



NOTES:

1. Cut-in tee may use F.E.x.F.E. or F.E.x.M.J. as called out on the drawings.
2. Use pipe material similar to existing mainline (PVC pipe shall be 3' min. length).

ITEM	DESCRIPTION
1	F.E.x.F.E. (or F.E.x.M.J.) gate valve per Potable Water Material Guidelines.
2	D.I.P. F.E.x.P.E. per Potable Water Material Guidelines.
3	F.E.x.F.E. tee per Potable Water Material Guidelines.
4	Flexible coupling per Potable Water Material Guidelines. For same size O.D. use Ductile Iron M.J. sleeve.

APPROVED BY: GSWC STANDARDS COMMITTEE		TITLE: CUT-IN TEE			
EDC MANAGER 01/16 DATE	Golden State Water Company	SCALE: NONE	DATE: 01/16	REV 1.0	STANDARD DWG NO. P-24

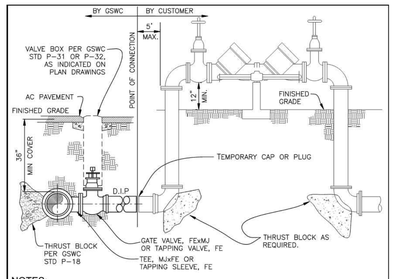
NEW SERVICE INSTALLATION NOTES:

1. Meter box placement shall be per GSWC Std. Dwg. No. P-28 and/or as shown on plans. No meters shall be installed beyond limits of public right of way without easements, unless otherwise indicated on plans.
2. 12" minimum spacing between service taps, except on ACP and PVC mains where 24" minimum spacing shall be provided.
3. For HDPE service lines, snake the service line in the trench to provide enough slack to allow at least one foot of thermal contraction per 100 feet of length. Attach tracer wire to HDPE service line.
4. No joints permitted in service lines unless an elbow is used for the 2" water service connection.
5. All new services shall be installed using service saddles.
6. For ¾"x ¾" meter, use an A24 adapter.
7. For ¾"x ¾" meter, use an A34 adapter.
8. For a 1" angle meter valve, 1" copper pack joint x ¾" meter nut may be utilized when specified on construction plans.
9. Services shall be installed a minimum of 10 feet from all sewer laterals and proposed street tree or street light locations.
10. In areas with corrosive soils use HDPE service lines with tracer wire.
11. Use silver solder (lead free) for all copper service work.
12. Applicant to install backflow prevention assembly per requirements of GSWC's Cross-Connection Control Policy on all services as called for on the plans.
13. Curb marking will be as allowed by the local governing agency.

REPLACEMENT HOUSELINE NOTES:

1. Minimum size shall be no less than 1 inch.
2. If the existing houseline is copper, it will be replaced with type K same size copper. If the existing houseline is standard galvanized or plastic, it will be replaced with HDPE or PVC SCH 80 unless the local building code specifies other material.
3. There is to be no PVC above grade. Above grade pipe shall match customer's existing material. For bidding purposes contractor shall bid copper pipe with dielectric couplings.
4. A gate valve will be installed on new houselines that bypasses an existing valve.
5. Depth of houseline shall meet the requirements of the local plumbing code.
6. Reconnect the houseline no closer than 14 feet to the house. Cap the original houseline at the location of the original meter, unless otherwise noted. Flush original line in both directions until clear before installing cap.
7. Contractor will supply a list of materials used for each houseline and an as-built drawing of houseline installation.
8. Contractor shall restore impacted areas to equal or better than condition prior to performing work.
9. Curb marking will be as allowed by the local governing agency.

APPROVED BY: GSWC STANDARDS COMMITTEE		TITLE: WATER SERVICE CONSTRUCTION NOTES			
EDC MANAGER 1/18 DATE	Golden State Water Company	SCALE: NONE	DATE: 1/18	REV 1.3	STANDARD DWG NO. P-25



NOTES:

1. Developer shall install a GSWC acceptable backflow preventer. Installation shall comply with all applicable rules, regulations, and ordinances. Depending on the application, a Reduced Pressure Principle Detector Assembly (RPDA) or Double Check Valve Detector Assembly (DCDA) may be required.
2. The assembly must be accessible for testing and maintenance. The assembly shall be installed above ground and a minimum of 12" above finished grade with a maximum of 36" and a minimum clearance of 12" or as needed if installed close to a building or structure.
3. All newly installed Backflow Prevention Assemblies must be tested in accordance with applicable regulations prior to being put in service and yearly thereafter. Copies of test results shall be submitted to GSWC prior to activation.
4. The Backflow Assembly shall be installed within five feet of the point of connection to the utility. There may be no connections or tees between the meter or point of connection and the Backflow Assembly.
5. Assemblies shall be horizontal and level unless approved for other orientations.
6. Backflow Assemblies are to be used within their rated operating conditions.
7. All installations of Backflow Assemblies must be in compliance with state and local plumbing and building codes. Contact local administrative authority for detailed requirements.

APPROVED BY: GSWC STANDARDS COMMITTEE		TITLE: BACKFLOW ASSEMBLY FOR FIRE SERVICES			
CHAIRPERSON 10/16 DATE	Golden State Water Company	SCALE: NONE	DATE: 10/16	REV 1.1	STANDARD DWG NO. P-35B

GENERAL NOTES

1. ALL WORK SHALL BE IN CONFORMANCE WITH THE LAKEWOOD DEPARTMENT OF PUBLIC WORKS' STANDARD SPECIFICATIONS AND DETAILS. ALL WORK SHALL BE SUBJECT TO APPROVAL OF AND INSPECTION BY THE CITY ENGINEER.
2. AT LEAST ONE SET OF APPROVED PLANS SHALL BE ON THE SITE AT ALL TIMES FOR INSPECTION. ANY DEVIATION FROM THE APPROVED PLANS DURING CONSTRUCTION WILL REQUIRE 48 HOURS PRIOR NOTICE AND APPROVAL OF THE CITY ENGINEER.
3. THE PERMITTEE/CONTRACTOR SHALL NOTIFY THE LAKEWOOD ENGINEERING DIVISION TWO (2) BUSINESS DAYS PRIOR TO THE START OF ANY WORK.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO ASCERTAIN THE EXISTENCE OF ANY AND ALL UNDERGROUND FACILITIES, WHICH MAY BE SUBJECT TO DAMAGE BY REASON OF HIS OPERATIONS. THE CONTRACTOR SHALL NOTIFY UNDERGROUND SERVICE ALERT (USA) AT (800) 642-2444, 48 HOURS PRIOR TO ANY EXCAVATION. WORK SHALL START WITHIN 5 DAYS AFTER THE ISSUANCE OF A USA INQUIRY IDENTIFICATION NUMBER. COMPLETE REMOVAL OF THE USA MARKINGS SHALL BE WITHIN 2 WORKING DAYS AFTER COMPLETION OF THE EXCAVATION, BACKFILL AND SURFACE REPLACEMENT OR FOURTEEN (14) CALENDAR DAYS FOLLOWING THE ISSUANCE OF THE INQUIRY IDENTIFICATION NUMBER WHICHEVER IS EARLIER.
5. CONTACTING USA DOES NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY TO DETERMINE LOCATION AND DEPTH OF BURIED UTILITIES OR REPAIR OF BURIED UTILITIES DAMAGED BY HIS OPERATION.
6. ALL GRADING, SITE PREPARATION, PLACING AND COMPACTION OF FILL SHALL BE DONE IN ACCORDANCE WITH THE CITY OF LAKEWOOD STANDARDS, SPECIFICATIONS, SPECIFIC NOTES, DETAIL DRAWINGS AND PER THE RECOMMENDATIONS SPECIFIED IN THE "GEOTECHNICAL INVESTIGATION" BY ASSOCIATED SOILS ENGINEERING, INC., DATED JANUARY 20, 2023, FILE NO. 7098.22.
7. A GRADING PERMIT IS REQUIRED PRIOR TO COMMENCEMENT OF GRADING. A COPY OF THE GRADING PERMIT IS REQUIRED TO BE ON SITE AT ALL TIMES.
8. GRADING OPERATIONS SHALL BE CONDUCTED IN ACCORDANCE WITH THE RECOMMENDATIONS CONTAINED IN THE SOILS INVESTIGATION REPORT. THE SOILS ENGINEER WILL BE RESPONSIBLE FOR THE ON SITE INSPECTION AND QUALITY CONTROL FOR THE GRADING OPERATION. PLAN REQUIREMENTS AND CONSTRUCTION CONTROL WITH RESPECT TO EARTHWORK, SLOPE STABILITY, SETTLEMENT, COMPACTION, ETC., AS SHOWN HEREIN ARE PROVIDED BY THE SOILS ENGINEER. THE CONTRACTOR SHALL READ AND BE FULLY AWARE OF THE SOILS REPORT BEFORE STARTING WORK. ALL WORK SHALL MEET THE APPROVAL OF THE SOILS ENGINEER.

   SUBSEQUENT TO THE COMPLETION OF THE WORK, THE SOILS/GEOTECHNICAL ENGINEER SHALL SUBMIT A REPORT TO THE CITY ENGINEER STATING THAT ALL WORK HAS BEEN DONE IN ACCORDANCE WITH THE "GEOTECHNICAL INVESTIGATION" PREPARED BY BY ASSOCIATED SOILS ENGINEERING, INC., DATED JANUARY 20, 2023, FILE NO. 7098.22.
9. NOISE-PRODUCING CONSTRUCTION AND GRADING OPERATIONS SHALL BE LIMITED TO WEEKDAYS (MONDAY THROUGH FRIDAY) EXCEPT CITY HOLIDAYS AND FROM THE HOURS OF 7:30 A.M. TO 6:00 P.M. ALL EQUIPMENT SHALL BE ADEQUATELY MUFFLED AND MAINTAINED. NO CHANGES SHALL BE ALLOWED WITHOUT PRIOR WRITTEN CONSENT OF THE CITY. ALL REQUESTS FOR CHANGE MUST BE MADE A MINIMUM OF 72 HOURS PRIOR TO THE NEED FOR THE IMPLEMENTATION OF THE REQUESTED CHANGE.
10. IT SHALL BE UNDERSTOOD THAT THE TERM "CITY ENGINEER" AS USED HEREIN IS THE CITY ENGINEER OF THE CITY OF LAKEWOOD OR HIS AUTHORIZED REPRESENTATIVE.

    NO WORK SHALL BE DONE ON THIS PROJECT PRIOR TO A PRE-CONSTRUCTION CONFERENCE TO BE HELD WITH THE ENGINEERING DIVISION. CONTACT _____ TO ARRANGE FOR THE CONFERENCE AT (___) ___-____.
11. A PRE-CONSTRUCTION CONFERENCE SHALL BE SCHEDULED AT LEAST TWO WORKING DAYS IN ADVANCE OF COMMENCEMENT OF ANY CONSTRUCTION WORK FOR THE IMPROVEMENTS DELINEATED WITHIN THIS SET OF PLANS. THE FOLLOWING INDIVIDUALS SHALL BE IN ATTENDANCE: OWNER/DEVELOPER, CONTRACTOR(S), CITY ENGINEER, ENGINEER, SOILS ENGINEER, CONSTRUCTION INSPECTOR, OR THEIR AUTHORIZED REPRESENTATIVES.
12. THE CONTRACTOR SHALL SUBMIT A SCHEDULE OF ALL GRADING OPERATIONS AND RECEIVE APPROVAL OF SAID SCHEDULE FROM THE CITY ENGINEER PRIOR TO OR THE DAY OF THE PRE-CONSTRUCTION CONFERENCE.
13. THE CONSTRUCTION CONTRACTOR AGREES, THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR THE JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENT SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
14. THE CONTRACTOR SHALL PROVIDE EMERGENCY TELEPHONE NUMBERS FOR PUBLIC WORKS, AMBULANCE, POLICE, AND FIRE DEPARTMENTS AT THE JOB SITE.
15. THE CONTRACTOR SHALL NOT DISTURB OR DESTROY ANY PERMANENT SURVEY POINTS WITHOUT THE CONSENT OF THE CITY ENGINEER. IN THE EVENT IT BECOMES NECESSARY TO REMOVE OR DISTURB A MONUMENT, THE PERSON SO DOING SHALL FIRST OBTAIN PERMISSION, IN WRITING, FROM THE CITY ENGINEER AND SHALL DEPOSIT WITH THE CITY ENGINEER A SUFFICIENT AMOUNT, BASED UPON THE CITY ENGINEER'S ESTIMATE, TO COVER THE COST OF PRELIMINARY REFERENCING AND FINAL RELOCATION OF THE MONUMENT.
16. ALL CONSTRUCTION STAKING SHALL BE DONE BY A REGISTERED CIVIL ENGINEER OR LICENSED LAND SURVEYOR. UPON COMPLETION OF GRADING, THE CONTRACTOR SHALL REQUEST THE LICENSED LAND SURVEYOR TO CHECK THE GRADES AND CERTIFY THAT THE PADS ARE GRADED TO WITHIN ± 0.10 FOOT OF FINISH PAD GRADE.
17. THE CONTRACTOR SHALL PROVIDE FOR INGRESS AND EGRESS TO AND FROM PRIVATE PROPERTY ADJACENT TO THE WORK AREA THROUGHOUT THE PERIOD OF CONSTRUCTION.
18. THE CONTRACTOR IS RESPONSIBLE FOR MATCHING EXISTING STREETS, SURROUNDING LANDSCAPE AND OTHER IMPROVEMENTS, WITH A SMOOTH TRANSITION IN GRADE AVOIDING ANY ABRUPT OR APPARENT CHANGES IN GRADE OR CROSS SLOPE, LOW SPOTS, OR HAZARDOUS CONDITIONS.
19. ALL UTILITY STRUCTURES/VAULTS INSTALLED IN PAVED AREAS SHALL HAVE THE STRUCTURE/VAULT LID INSTALLED TO SLOPE WITH THE PAVEMENT.
20. EXISTING CURB AND SIDEWALK WITHIN THE PROJECT LIMITS THAT ARE DAMAGED OR DISPLACED, EVEN THOUGH THEY WERE NOT TO BE REMOVED, SHALL BE REPAIRED OR REPLACED, EVEN IF THE DAMAGE OR DISPLACEMENT OCCURRED PRIOR TO ANY WORK PERFORMED BY THE CONTRACTOR. CONTRACTOR SHALL DOCUMENT CONDITION VIA PHOTOGRAPHS PRIOR TO THE START OF CONSTRUCTION.
21. THE CONTRACTOR SHALL CONTROL DUST BY WATERING EXPOSED SURFACES AS NEEDED. INCREASED WATERING SHALL BE REQUIRED WHEN WIND SPEEDS EXCEED 10 MPH OR WHEN DIRECTED BY THE CITY.
22. NO PERSON SHALL, WHEN HAULING ANY EARTH, SAND, GRAVEL, STONE, DEBRIS, PAPER, OR ANY OTHER SUBSTANCE OVER ANY PUBLIC STREETS OR OTHER PUBLIC PLACE, ALLOW MATERIAL TO BLOW OR SPILL OVER AND UPON SAID PUBLIC OR ADJACENT PRIVATE PROPERTY. ALL LOADS LEAVING THE SITE SHALL BE COVERED.
23. THE CONTRACTOR SHALL PROVIDE A STABILIZED CONSTRUCTION ENTRANCE/EXIT TO PREVENT THE TRACKING OF SOIL, DUST, MUD, OR CONSTRUCTION DEBRIS ONTO PUBLIC STREETS.
24. MUD TRACKED ONTO STREETS OR ADJACENT PROPERTIES SHALL BE REMOVED IMMEDIATELY. STREET SHALL BE SWEPT WITH A POWER SWEEPER (NOT PRESSURE WASHED) AS DIRECTED BY THE CITY.
25. A DISPOSAL SITE FOR ANY OFF-SITE HAUL OF DIRT MATERIALS SHALL BE APPROVED BY THE CITY PRIOR TO APPROVAL OF THE GRADING PERMIT. THE OFF-SITE HAUL ROUTE FOR EXCESS DIRT OR CONSTRUCTION DEBRIS IS SUBJECT TO APPROVAL OF THE CITY ENGINEER.
26. EXCAVATIONS SHALL BE ADEQUATELY SHORED, BRACED AND SHEETED SO THAT THE EARTH WILL NOT SLIDE OR SETTLE AND SO THAT ALL EXISTING IMPROVEMENTS OF ANY KIND WILL BE FULLY PROTECTED FROM DAMAGE. ANY DAMAGE RESULTING FROM A LACK OF ADEQUATE SHORING, BRACING AND SHEETING, SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND THE CONTRACTOR SHALL EFFECT NECESSARY REPAIRS OR RECONSTRUCTION AT HIS OWN EXPENSE. WHERE THE EXCAVATION FOR A TRENCH, STRUCTURE AND/OR BORING OR JACKING PIT IS FIVE FEET OR MORE IN DEPTH THE CONTRACTOR SHALL CONFORM TO THE APPLICABLE CONSTRUCTION SAFETY ORDERS OF THE DIVISION OF INDUSTRIAL SAFETY OF THE STATE OF CALIFORNIA.
27. ALL TRENCHES IN EXISTING CITY STREETS SHALL BE BACKFILLED AND PAVED WITHIN 24 HOURS OF EXCAVATION. STEEL PLATES MAY BE PLACED OVER UNBACKFILLED TRENCHES BEYOND THE 24 HOUR PERIOD WITH THE SPECIFIC APPROVAL OF THE CITY ENGINEER.
28. ALL REINFORCED CONCRETE PIPE SHALL BE CLASS III OR BETTER, UNLESS OTHERWISE NOTED.
29. OPERATION OF VALVES ON THE GOLDEN STATE WATER COMPANY WATER SYSTEM SHALL BE PERFORMED BY WATER PURVEYOR JURISDICTIONAL PERSONNEL ONLY.

CONCRETE NOTES

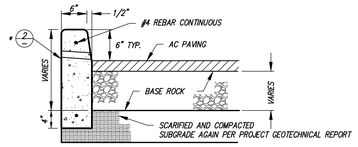
1. MINIMUM 28 DAY COMPRESSIVE STRENGTH OF SITE CONCRETE SHALL BE 3,000 PSI FOR AREAS NOT SUBJECT TO VEHICULAR TRAFFIC AND 4,000 PSI FOR AREAS SUBJECT TO VEHICULAR TRAFFIC. UNLESS OTHERWISE NOTED CONTRACTOR SHALL SUBMIT MIX DESIGNS FOR REVIEW BY THE ENGINEER OF RECORD.
2. ALL CONCRETE SHALL HAVE A MAXIMUM W/C RATIO OF 0.55 AND A MAXIMUM SLUMP OF 4".
3. ALL REINFORCING STEEL, DOWELS, AND TIE BARS SHALL BE AT MINIMUM 60 KSI AND INSTALLED PER ACI GUIDELINES.
4. CONTRACTOR SHALL USE A WHITE PIGMENTED MEMBRANE FORMING CURING COMPOUND MEETING ASTM C309 OR C1315 (TYPE I) REQUIREMENTS FOLLOWING THE NORMAL CURING PROCEDURE RECOMMENDED BY THE MANUFACTURER.
5. JOINTING PLAN:
   A. CONTRACTOR TO PROVIDE JOINTING PLAN TO ENGINEER FOR REVIEW AND APPROVAL SHOWING LOCATION AND SPACING OF CONTRACTION AND ISOLATION JOINTS AS SHOWN ON DETAIL SHEETS. AT THIS TIME IT SHOULD BE DETERMINED IF CURBS ARE BEING POURED MONOLITHICALLY AND JOINTING ADJUSTED ACCORDINGLY.
   B. JOINT PANELS TO BE APPROXIMATELY SQUARE WITH THE LENGTH OF PANEL BEING NO MORE THAN 25% GREATER THAN WIDTH.
   C. MAXIMUM JOINT SPACING SHALL BE AS CLOSE AS PRACTICAL TO THE FOLLOWING FORMULA (2 x SLAB THICKNESS IN INCHES = JOINT SPACING IN FEET). JOINT SPACING SHALL NOT EXCEED THIS VALUE BY 15%
   D. CONTRACTION JOINTS SHALL BE 1/4 THE SLAB THICKNESS. TOOLED CONTRACTION JOINTS CAN BE UTILIZED FOR SLAB LESS THAN 5" THICK. SLABS 5" AND GREATER SHALL HAVE CONTRACTION JOINTS SAWN. SAWING OF CONTRACTION JOINTS SHALL BE DONE AS EARLY AS POSSIBLE, KEEPING IN MIND THAT WEATHER, MIX DESIGN AND JOB SITE CONDITIONS MAY IMPACT JOINTING SCHEDULE.
6. CONCRETE COLOR SHALL BE STANDARD GREY WITH LIGHT BROOM FINISH UNLESS OTHERWISE NOTED ON PLANS. CONTRACTOR SHALL REVIEW ARCHITECTURAL AND LANDSCAPE ARCHITECT PLANS FOR ADDITIONAL COLORING, FINISHING OR JOINTING DETAILS.
7. THE ABOVE NOTES PERTAIN TO NON-STRUCTURAL SITE CONCRETE ONLY.

GRADING NOTES

1. ALL GRADING SHALL BE DONE IN ACCORDANCE WITH RECOMMENDATIONS IN THE GEOTECHNICAL INVESTIGATION PREPARED FOR THIS SITE BY ASSOCIATED SOILS ENGINEERING, INC., DATED JANUARY 20, 2023, FILE NO. 7098.22.
2. CONTRACTOR SHALL DETERMINE HIS OWN EARTH QUANTITIES AND BASE HIS BID ACCORDINGLY.
3. TOP OF CURB ELEVATION IS 0.5' ABOVE THE A.C. PAVING AND SPOT ELEVATIONS ARE TO FINISHED SURFACE (UNLESS OTHERWISE NOTED).
4. COMPACTION TO BE DETERMINED USING ASTM D1557, LATEST EDITION LABORATORY TEST PROCEDURE.
5. STORM DRAIN DESIGNATED AS "SD" SHALL BE CLASS III RCP, SDR 35 PVC OR HDPE AS STATED BELOW. PVC AND HDPE PIPES SHALL ONLY BE USED WHEN MINIMUM COVER REQUIREMENTS ARE MET AS SPECIFIED IN THE PVC PIPE BEDDING DETAIL AS SHOWN ON THESE PLANS. SUBSTITUTIONS FOR ANY PIPE WITH A PARTICULAR MATERIAL SPECIFIED ON THIS PLAN SHALL ONLY BE MADE WITH THE WRITTEN APPROVAL OF THE ENGINEER.
6. STORM DRAIN PIPE SHALL BE: 10" DIAMETER AND SMALLER SDR 35 PVC OR HDPE WITH RUBBER GASKETS MEETING ASTM F477. 12" DIAMETER TO BE SDR 35 PVC, CLASS III RCP OR BLUE SEAL HDPE AS MANUFACTURED BY HANCOR WITH WATER TIGHT JOINTS MEETING ASTM F477 AND ASTM D3212. 15" THROUGH 24" DIAMETERS: PIPE TO BE CLASS III RCP OR BLUE SEAL HDPE AS SPECIFIED ABOVE. PIPES LARGER THAN 24" IN DIAMETER SHALL BE CLASS III RCP UNLESS OTHERWISE NOTED. NO MATERIAL SUBSTITUTION SHALL BE ALLOWED FOR DUCTILE IRON PIPE (DIP).
7. ALL UTILITY STRUCTURES INCLUDING, BUT NOT LIMITED TO MANHOLES, CATCH BASINS, WATER VALVES, FIRE HYDRANTS, TELEPHONE AND ELECTRIC VAULTS, AND PULL BOXES, THAT LIE WITHIN THE PUBLIC RIGHT-OF-WAY EASEMENTS OR AREAS AFFECTED BY WORK ON THIS PROJECT SHALL BE ADJUSTED TO GRADE BY THE CONTRACTOR OR THE RESPECTIVE UTILITY COMPANY FOR WHICH THE CONTRACTOR IS RESPONSIBLE TO AFFECT COORDINATION.
8. THE TYPES, LOCATIONS, SIZES AND/OR DEPTHS OF EXISTING UNDERGROUND UTILITIES AS SHOWN ON THESE IMPROVEMENT PLANS WERE OBTAINED FROM SOURCES OF VARYING RELIABILITY. THE CONTRACTOR IS CAUTIONED THAT ONLY ACTUAL EXCAVATION WILL REVEAL THE TYPES, EXTENT, SIZES, LOCATIONS AND DEPTHS OF SUCH UNDERGROUND UTILITIES. A REASONABLE EFFORT HAS BEEN MADE TO LOCATE AND DELINEATE ALL KNOWN UNDERGROUND UTILITIES. HOWEVER, THE ENGINEER CAN NOT ASSUME RESPONSIBILITY FOR THE COMPLETENESS OR ACCURACY OF THEIR DELINEATION OF SUCH UNDERGROUND UTILITIES WHICH MAY BE ENCOUNTERED, BUT ARE NOT SHOWN ON THESE DRAWINGS.
9. CONTRACTOR SHALL UNCOVER AND EXPOSE ALL EXISTING UTILITY AND SEWER LINES WHERE THEY ARE TO BE CROSSED, ABOVE OR BELOW, BY THE NEW FACILITY BEING CONSTRUCTED IN ORDER TO VERIFY THE GRADE AND TO ASSURE THAT THERE IS SUFFICIENT CLEARANCE. PIPE SHALL NOT BE STRUNG NOR TRENCHING COMMENCED UNTIL ALL CROSSINGS HAVE BEEN VERIFIED FOR CLEARANCE. IF THE CONTRACTOR FAILS TO FOLLOW THIS PROCEDURE, HE WILL BE SOLELY RESPONSIBLE FOR ANY EXTRA WORK OR MATERIAL REQUIRED IF MODIFICATIONS TO THE DESIGN ARE NECESSARY.
10. THE CONTRACTOR SHALL SET HIS STRING OR WIRE THROUGH AT LEAST THREE GRADE STAKES TO VERIFY GRADE. IF THE STAKES DO NOT PRODUCE A UNIFORM GRADE, NOTIFY THE ENGINEER IMMEDIATELY AND HAVE THE GRADES CHECKED PRIOR TO TRENCHING OR PLACEMENT OF CONCRETE.
11. ADJUSTMENTS TO BUILDING PAD ELEVATIONS OR PARKING LOT GRADES TO ACHIEVE EARTHWORK BALANCE SHALL BE MADE ONLY WITH APPROVAL OF THE ENGINEER.
12. ALL WORK, ON-SITE AND IN THE PUBLIC RIGHT-OF-WAY, SHALL CONFORM TO THE CITY OF VERNON STANDARDS AND REQUIREMENTS.

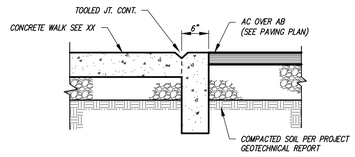
UTILITY NOTES

1. BACKFILLING AND COMPACTION FOR ALL TRENCHES SHALL BE INSPECTED AND APPROVED BY THE GEOTECHNICAL ENGINEER.
2. CONTRACTOR TO VERIFY ALL EXISTING INVERT ELEVATIONS FOR STORM DRAIN AND SANITARY SEWER CONSTRUCTION PRI

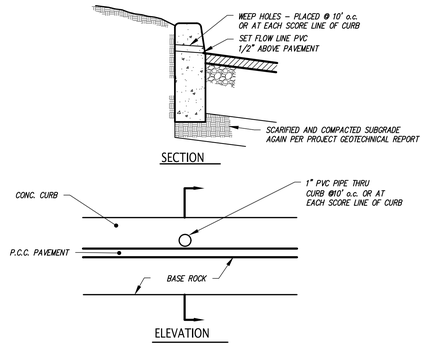


* WEEP HOLES TO BE PLACED ON ALL CURBS AND CURB & GUTTER WHERE LANDSCAPING SLOPES TOWARD CURB. WEEP HOLES SHALL BE PLACED AT 10' O.C. OR AT EACH SCORE LINE OF THE CURB.

CONCRETE CURB 1
NOT TO SCALE

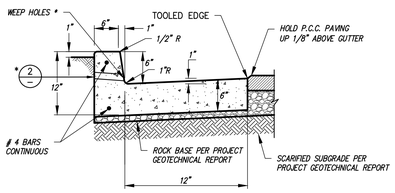


FLUSH CURB 5
NOT TO SCALE



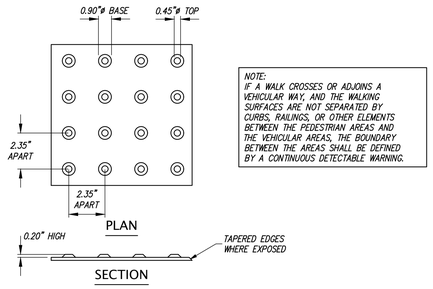
WEEP HOLE 2
NOT TO SCALE

NOTE:
SCORE LINES SHALL BE 10' O.C. U.O.N.



* WEEP HOLES TO BE PLACED ON ALL CURBS AND CURB & GUTTER WHERE LANDSCAPING SLOPES TOWARD CURB. WEEP HOLES SHALL BE PLACED AT 10' O.C. OR AT EACH SCORE LINES OF THE CURB.

CONCRETE CURB & GUTTER 3
NOT TO SCALE



NOTE:
IF A WALK CROSSES OR ADJOINS A VEHICULAR WAY, AND THE WALKING SURFACES ARE NOT SEPARATED BY CURBS, RAILINGS, OR OTHER ELEMENTS BETWEEN THE PEDESTRIAN AREAS AND THE VEHICULAR AREAS, THE BOUNDARY BETWEEN THE AREAS SHALL BE DEFINED BY A CONTINUOUS DETECTABLE WARNING.

TRUNCATED DOMES 4
NOT TO SCALE

DAHLIN
505 TECHNOLOGY DRIVE
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA
CLIENT

KIER+WRIGHT
8955 RESEARCH DRIVE
IRVINE, CALIFORNIA 92618
949-508-0202
CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

REVISIONS

REGISTERED PROFESSIONAL ENGINEER
DAVID G. REASNER
No. 76867
CIVIL
STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	JM
CHECK	DGR

SHEET NAME
DETAILS

SHEET
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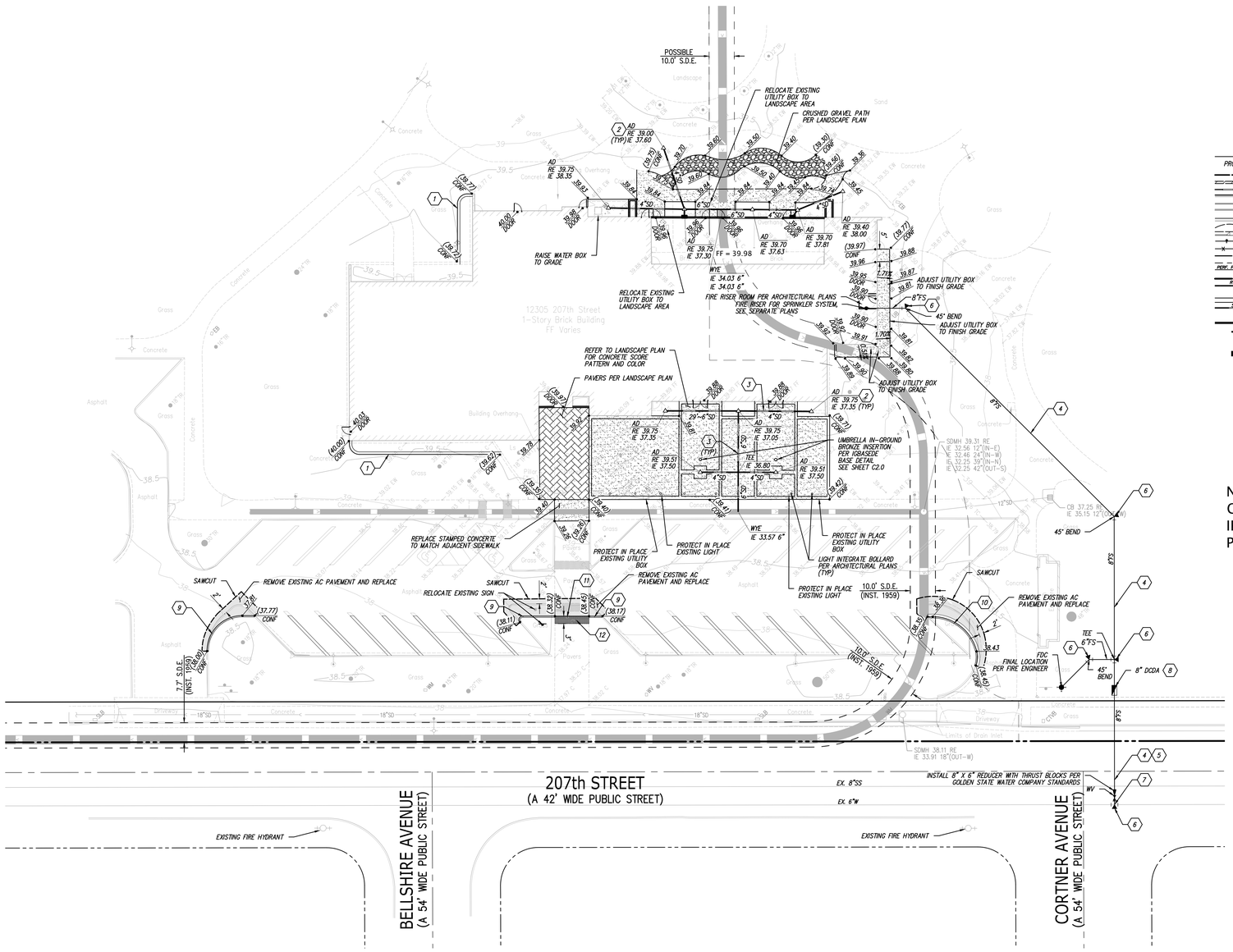

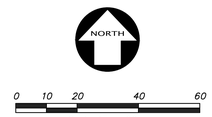

LEGEND

PROPOSED	EXISTING		PROPOSED	EXISTING	
		ASPHALT BERM	FB	FB	FACE OF BERM
		BLOCK/RETAINING WALL	FC	FC	FACE OF CURB
		BUILDING LINE	FW	FW	FACE OF WALL
		FLUSH CONCRETE CURB	FF	FF	FINISHED FLOOR
		CONCRETE CURB	FL	FL	FLOW LINE
		CONCRETE CURB CUT	GB	GB	GRADE BREAK
		CONCRETE CURB & GUTTER	HP	HP	HIGH POINT
		CONTOUR LINE	IE	IE	INVERT ELEVATION
		DRIVEWAY	LP	LP	LOW POINT
		EDGE OF PAVEMENT	LT	LT	LIGHT
		FENCE LINE	OF	OF	OVERFLOW
		LOT LINE	PV	P	PAVEMENT
		MONUMENT/MONUMENT LINE	RWL	RWL	RAINWATER LEADER
PERF. PIPE		PERFORATED STORM DRAIN PIPE	R	R	RIDGE
		PROPERTY LINE	RE	RE	RIM ELEVATION
RWL	RWL	RAINWATER LEADER	RD	RD	ROOF DRAIN
		ROOF DOWNSPOUT	SDJB	SD,IB	STORM DRAIN JUNCTION BOX
		SIDEWALK	SDMH	SDMH	STORM DRAIN MANHOLE
SD		STORM DRAIN--MANHOLE & CATCH BASIN	SWL	SWL	SWALE
			TB	TB	TOP OF BERM
		THRU CURB DRAIN	TC	TC	TOP OF CURB
100.00	+100.00	SPOT ELEVATION	TW	TW	TOP OF WALL
		TRAFFIC SIGN	T	T	TRANSFORMER
		TREE	TE	TE	TRASH ENCLOSURE
		UTILITY BOX			CONCRETE SIDEWALK: 4" PCC OVER 4" CLASS II AB WITH #3 @ 18" O.C.
AD	AD	AREA DRAIN			3/4" CRUSHED GRAVEL PER LANDSCAPE PLANS
BW	BW	BACK OF WALK			AC PAVEMENT MATCH EXISTING PAVEMENT SECTION OR INSTALL 12" FULL DEPTH AC
BLDG	BLDG	BUILDING			
BL	BL	BUILDING LINE			
CB	CB	CATCH BASIN			
CJ	CJ	CONTROL JOINT			
CONF	CONF	CONFORM TO GRADE			
COTG	COTG	CLEANOUT TO GRADE			
C	C	CONCRETE	1		CONCRETE MOW STRIP. REFER TO LANDSCAPE PLANS
DR	DR	DOOR	2		AREA DRAIN PER DETAIL 1/C2.0
DS	DS	DOWN SPOUT	3		PIPE BEDDING PER DETAIL 2/C2.0
DIP	DIP	DUCTILE IRON PIPE	4		WATER PIPE BEDDING PER GOLDEN STATE WATER COMPANY STANDARD DETAIL P-3
EJ	EJ	EXPANSION JOINT	5		TRENCH REPAVING PER GOLDEN STATE WATER COMPANY STANDARD DETAIL P-4
ESMT	ESMT	EASEMENT	6		THRUST BLOCK PER GOLDEN STATE WATER COMPANY STANDARD DETAIL P-18
EW	EW	EDGE OF WALK	7		CONNECT FIRE SERVICE TO WATER MAIN PER GOLDEN STATE WATER COMPANY STANDARD DETAIL P-24
			8		INSTALL BACKFLOW ASSEMBLY PER GOLDEN STATE WATER COMPANY STANDARD DETAIL P-35B
			9		INSTALL 6" CURB PER DETAIL 1/C2.1
			10		INSTALL 6" CURB & GUTTER PER DETAIL 3/C2.1
			11		INSTALL FLUSH CURB PER DETAIL 5/C2.1
			12		INSTALL TRUNCATED DOMES PER DETAIL 4/C2.1

NOTE:
CONTRACTOR TO ADJUST LANDSCAPE AND IRRIGATION AS NEEDED TO ACCOMMODATE PROPOSED IMPROVEMENTS

CAUTION CONTRACTOR ALERT

CONTRACTOR SHALL VERIFY ACTUAL DEPTH AND LOCATION OF ALL EXISTING UTILITIES PRIOR TO CONSTRUCTION. CALL "UNDERGROUND SERVICE ALERT" (USA), CALL 811, 24 HOURS PRIOR TO DEMOLITION TRENCHING, GRADING, EXCAVATION, DRILLING, PIPE PUSHING, PLANTING TREES, DIGGING POST HOLES FOR FENCES, ETC. USA WILL SUPPLY INFORMATION OR LOCATE AND MARK ANY UNDERGROUND FACILITIES. UNDERGROUND FACILITIES SHOWN WERE LOCATED BASED ON INFORMATION PROVIDED BY UTILITY COMPANIES AND BY MEASURING SURFACE FEATURES.
NO ATTEMPT WAS MADE TO LOCATED OTHER UNDERGROUND FACILITIES THAT WERE NOT READILY APPARENT FROM A VISUAL INSPECTION OF SURFACE FEATURES.

BEFORE EXCAVATING
CALL U.S.A.
811 or (800) 642-2444
48-HOURS BEFORE ALL
PLANNED WORK OPERATIONS

NOTICE TO CONTRACTORS

CONTRACTOR TO NOTIFY USA (UNDERGROUND SERVICE ALERT) AT 811 A MINIMUM OF 24 HOURS BEFORE BEGINNING UNDERGROUND WORK FOR VERIFICATION OF THE LOCATION OF UNDERGROUND UTILITIES

811 Know what's below. Call before you dig.

DAHLIN
505 TECHNOLOGY DRIVE
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA
CLIENT

KIER+WRIGHT
8955 RESEARCH DRIVE
IRVINE, CALIFORNIA 92618
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PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

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REGISTERED PROFESSIONAL ENGINEER
DARYTO G. REKEDITA
No. 76867
CIVIL
STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	JM
CHECK	DGR

SHEET NAME
GRADING, DRAINAGE, & UTILITY PLAN

SHEET
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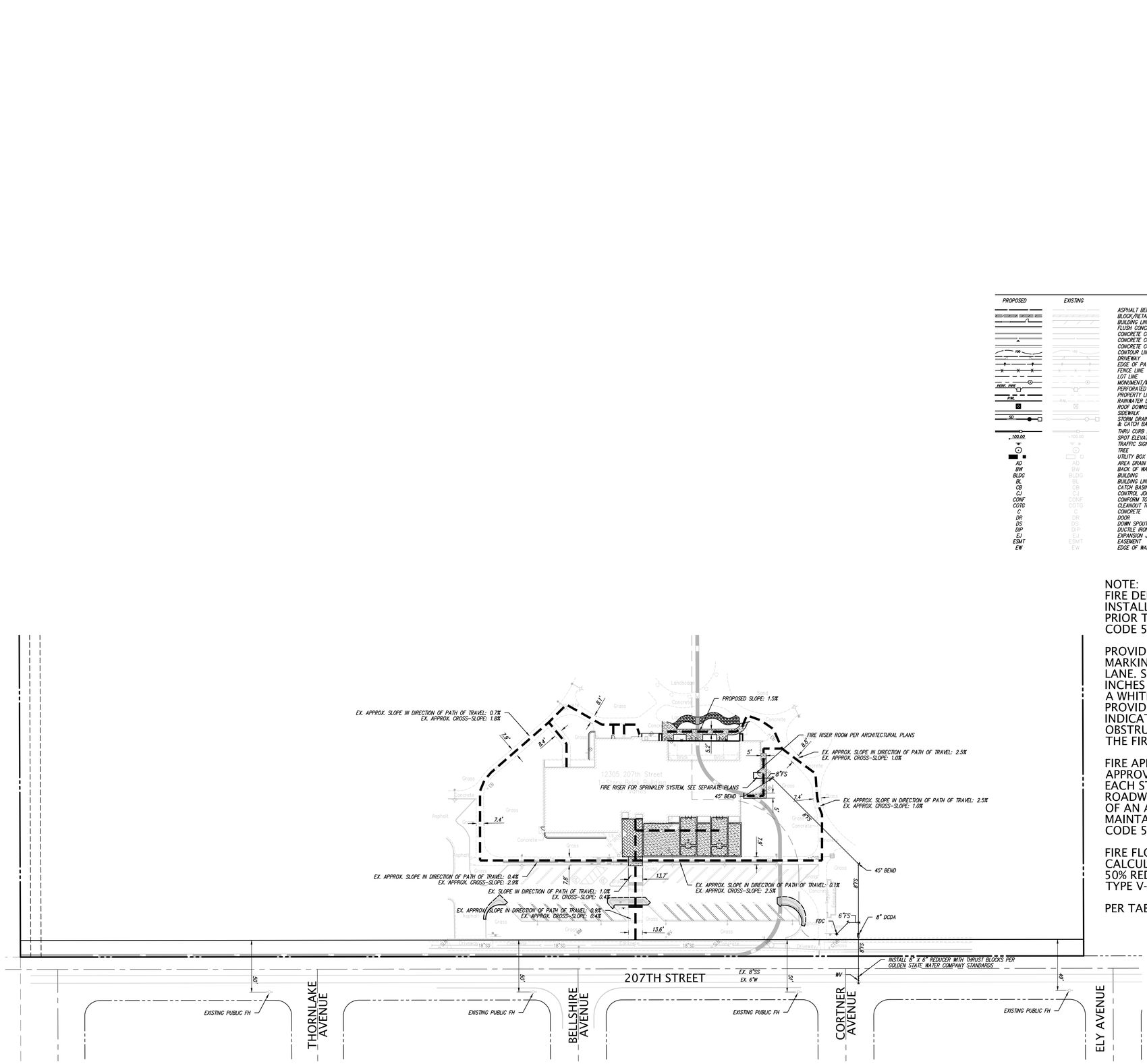

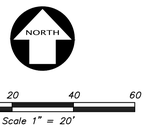

LEGEND

PROPOSED	EXISTING		PROPOSED	EXISTING	
		ASPHALT BERM	FB	FB	FACE OF BERM
		BLOCK/RETAINING WALL	FC	FC	FACE OF CURB
		BUILDING LINE	FW	FW	FACE OF WALL
		FLUSH CONCRETE CURB	FF	FF	FINISHED FLOOR
		CONCRETE CURB	FL	FL	FLOW LINE
		CONCRETE CURB CUT	GB	GB	GRADE BREAK
		CONCRETE CURB & GUTTER	HP	HP	HIGH POINT
100	100	CONTOUR LINE	IE	IE	INVERT ELEVATION
		DRIVEWAY	LP	LP	LOW POINT
		EDGE OF PAVEMENT	LT	LT	LIGHT
		FENCE LINE	OF	OF	OVERFLOW
		LOT LINE	PV	P	PAVEMENT
		MONUMENT/MONUMENT LINE	RWL	RWL	RAINWATER LEADER
PERF. PIPE		PERFORATED STORM DRAIN PIPE	R	R	RIDGE
		PROPERTY LINE	RE	RE	RIM ELEVATION
		RAINWATER LEADER	RD	RD	ROOF DRAIN
		ROOF DOWNSPOUT	SDJB	SDJB	STORM DRAIN JUNCTION BOX
		SIDEWALK	SDMH	SDMH	STORM DRAIN MANHOLE
SD		STORM DRAIN--MANHOLE & CATCH BASIN	SWL	SWL	SWALE
		THRU CURB DRAIN	TB	TB	TOP OF BERM
1000.00	+100.00	SPOT ELEVATION	TC	TC	TOP OF CURB
		TRAFFIC SIGN	TW	TW	TOP OF WALL
		TREE	T	T	TRANSFORMER
		UTILITY BOX	TE	TE	TRASH ENCLOSURE
					CONCRETE SIDEWALK: 4" PCC OVER 4" CLASS II AB WITH #3 @ 18" O.C.
					3/4" CRUSHED GRAVEL PER LANDSCAPE PLANS
					FIRE FIGHTER ACCESS WALKWAY
AD	AD	AREA DRAIN			
BW	BW	BACK OF WALK			
BLDG	BLDG	BUILDING			
BL	BL	BUILDING LINE			
CB	CB	CATCH BASIN			
CJ	CJ	CONTROL JOINT			
CONF	CONF	CONFORM TO GRADE			
COTG	COTG	CLEANOUT TO GRADE			
C	C	CONCRETE			
DR	DR	DOOR			
DS	DS	DOWN SPOUT			
DIP	DIP	DUCTILE IRON PIPE			
EJ	EJ	EXPANSION JOINT			
ESMT	ESMT	EASEMENT			
EW	EW	EDGE OF WALK			

NOTE:
FIRE DEPARTMENT VEHICULAR ACCESS ROADS MUST BE INSTALLED AND MAINTAINED IN A SERVICEABLE MANNER PRIOR TO AND DURING THE TIME OF CONSTRUCTION. FIRE CODE 503.1.1

PROVIDE APPROVED SIGNS OR OTHER APPROVED NOTICES OR MARKINGS THAT INCLUDE THE WORDS NO PARKING - FIRE LANE. SIGNS SHALL HAVE A MINIMUM DIMENSION OF 12 INCHES WIDE BY 18 INCHES HIGH AND HAVE RED LETTERS ON A WHITE REFLECTIVE BACKGROUND. SIGNS SHALL BE PROVIDED FOR FIRE APPARATUS ACCESS ROADS, TO CLEARLY INDICATE THE ENTRANCE TO SUCH ROAD, OR PROHIBIT THE OBSTRUCTION THEREOF AND AT INTERVALS, AS REQUIRED BY THE FIRE INSPECTOR. FIRE CODE 503.3.

FIRE APPARATUS ACCESS ROADS SHALL BE IDENTIFIED WITH APPROVED SIGNS. TEMPORARY SIGNS SHALL BE INSTALLED AT EACH STREET INTERSECTION WHEN CONSTRUCTION OF NEW ROADWAYS ALLOWS PASSAGE BY VEHICLES. SIGNS SHALL BE OF AN APPROVED SIZE, WEATHER RESISTANT, AND BE MAINTAINED UNTIL REPLACED BY PERMANENT SIGNS. FIRE CODE 505.2.

FIRE FLOW CALCULATIONS:
CALCULATION AREA: 14,660 SQ FT
50% REDUCTION
TYPE V-B

PER TABLE B105.1REQUIRED FLOW = 3,250 X 0.5 = 1625 GPM

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SUITE 200
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949-250-4680

CITY OF LAKEWOOD CALIFORNIA
CLIENT

KIER+WRIGHT
8955 RESEARCH DRIVE
IRVINE, CALIFORNIA 92618
949-508-0202
CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715
PW-23-01

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

REVISIONS

REGISTERED PROFESSIONAL ENGINEER DAVID E. REDLITZ No. 76867 CIVIL STATE OF CALIFORNIA
SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	JM
CHECK	DGR

SHEET NAME
FIRE EXHIBIT

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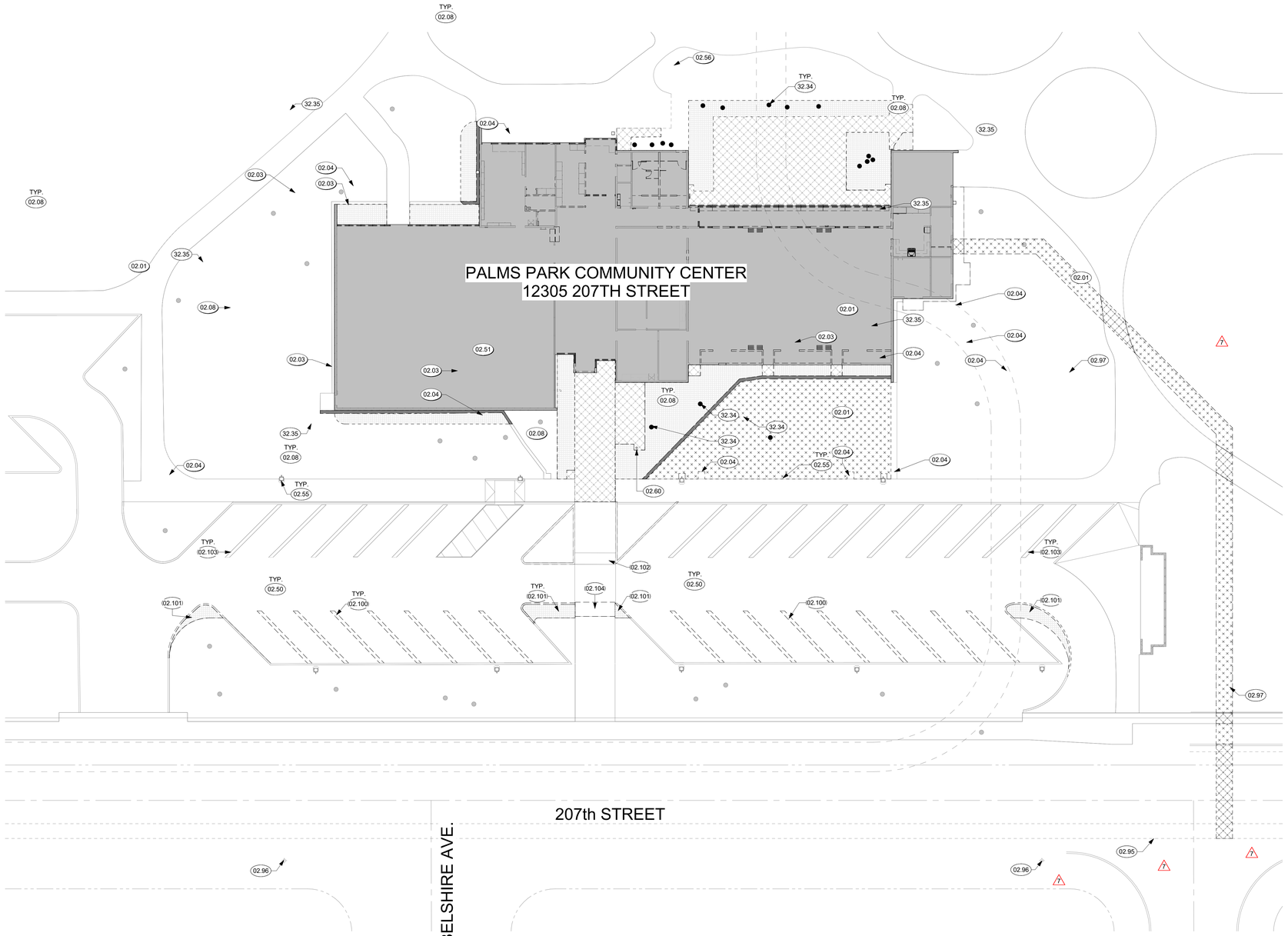
PALMS PARK COMMUNITY CENTER
12305 207TH STREET
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BELSHIRE AVE.
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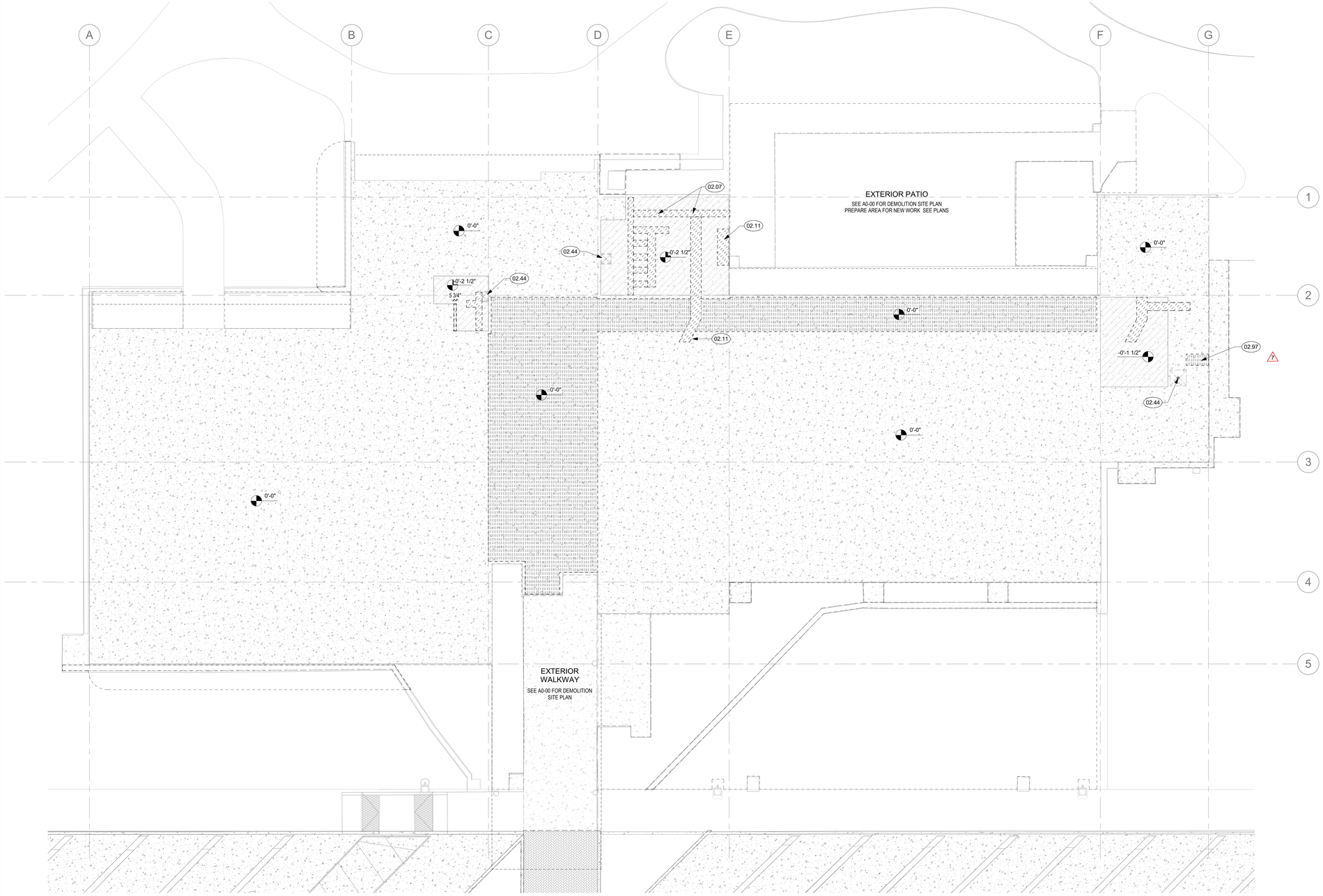

1 DEMO SLAB PLAN
1/8" = 1'-0"

DEMOLITION NOTES

1. VERIFICATION OF EXISTING FIELD CONDITIONS IS REQUIRED PRIOR TO COMMENCEMENT OF DEMOLITION. ANY DEVIATION FROM ASSUMED EXISTING CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND OWNER IMMEDIATELY.
2. ALL EXISTING MPE SYSTEMS TO BE MADE SAFE AND UTILITY SERVICES TO BE SHUT OFF PRIOR TO COMMENCEMENT OF DEMOLITION.
3. ALL EXISTING STRUCTURE WALLS, FLOORS AND ROOF FRAMING TO REMAIN U.N.O., PROTECT ALL EXISTING ELEMENTS TO REMAIN DURING CONSTRUCTION.
4. CONTRACTOR TO REMOVE AND DISPOSE OF ALL DEMOLITION AND CONSTRUCTION DEBRIS PER THE CITY OF LAKEWOOD DEBRIS RECOVERY PROGRAM.
5. DEMOLITION PLAN IS INTENDED TO AID CONTRACTOR IN DETERMINING THE EXTENT OF THE NECESSARY WORK. IT DOES NOT NECESSARILY DEPICT THE ACTUAL, OR ALL OF THE DEMOLITION WORK. CONTRACTOR IS RESPONSIBLE FOR ALL DEMOLITION WORK REQUIRED TO COMPLETE THIS PROJECT. CONTRACTOR TO STUDY THESE CONSTRUCTION DOCUMENTS AND PERFORM A THOROUGH FIELD INVESTIGATION PRIOR TO BIDDING THE PROJECT. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL REQUIRED ENGINEERED SHORING AND BRACING FOR THE PROJECT.
6. COORDINATE WITH OWNER PRIOR TO DEMOLITION TO CONFIRM WHICH ITEMS ARE TO BE REMOVED AND SALVAGED. THE CONTRACTOR IS RESPONSIBLE FOR DISCARDING ALL CONSTRUCTION DEBRIS.
7. REMOVE ALL INTERIOR SIGNAGE. PREPARE SURFACE FOR REPLACEMENT
8. SEE CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, AND LANDSCAPE DRAWINGS FOR ADDITIONAL DEMOLITION THAT MAY BE REQUIRED.
9. CONTRACTOR TO STRIP AS NEEDED, PATCH, REPAIR AND PREP ALL EXISTING SURFACES (FLOOR, WALLS, AND CEILING). RECEIVING NEW OR TOUCH UP FINISHES.
10. PATCH AND REPAIR ALL WALLS, FLOORS, AND STRUCTURE TO REMAIN THAT WERE DAMAGED DURING DEMOLITION PROCESS.
11. ALL FLOOR FINISHES TO BE REMOVED TO (E) CONCRETE SLAB U.N.O. PREPARE FLOORS FOR (N) FLOOR FINISHES.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF FINISHES AND/OR WALL BOARD AS REQUIRED FOR INSTALLATION OF ANY NEW ITEM(S) AND THEN REPLACE, PREP, PATCH AND/OR APPLY NEW FINISH(ES) AS PER PLANS OR (E) CONDITIONS.
13. FOR INFORMATION ON HAZARDOUS MATERIALS REMOVAL REFER TO HAZARDOUS MATERIAL REPORT IN SPECIFICATIONS
14. SAW CUT ALL CONCRETE TO BE REMOVED.
15. REMOVE AND REINSTALL: DETACH ITEMS FROM EXISTING CONSTRUCTION, PREPARE THEM FOR REUSE, PROTECT AND STORE AS REQUIRED, AND REINSTALL THEM WHERE INDICATED.
16. PRIOR TO THE START OF DEMOLITION, ALL REMEDIATION WORK LISTED IN THE ENVIRONMENTAL REPORT IS TO BE COMPLETED BY THE CONTRACTOR. REFER TO THE HAZARD REPORT BY OMEGA IN PROJECT MANUAL.
17. PRIOR TO THE START OF DEMOLITION, BEE MITIGATION AND REMOVAL TO COMPLETED BY OWNER. CONTRACTOR TO NOTIFY CLIENT IF ANY REMNANTS OF BEE REMOVAL REMAINS AND TO ASSIST IN COORDINATING THE ADDITIONAL REMOVAL.

DEMOLITION SLAB PLAN SYMBOLS

- (E) CONCRETE SLAB TO REMAIN
- (E) DEPRESSED SLAB
- DEMO (E) CONCRETE SLAB FOR NEW DEPRESSED SLAB OR FUTURE DRAINS/TRENCHING, SPD
- DEMO (E) CONCRETE SLAB TEXTURE, PREP SURFACE FOR NEW WORK
- ITEM TO BE REMOVED, UNO, SEE A0 SERIES SHEETS FOR ADDITIONAL INFORMATION

KEYNOTE LEGEND

- 02.07 REMOVE (E) FLOOR DRAIN. PREPARE PLUMBING FOR FUTURE TIE IN. S.P.D.
- 02.11 SAWCUT (E) STRUCTURAL SLAB FOR FUTURE UNDERGROUND PLUMBING. S.P.D. FOR EXTENT OF PLUMBING WORK.
- 02.44 REMOVE (E) MOP SINK, PREPARE AREA FOR NEW WORK, S.P.D.
- 02.97 PREPARE AND TRENCH AREA FOR (N) FIRE WATER LINE CONNECTION. FINAL ROUTING TO BE COORDINATED WITH OWNER AND FIRE PROTECTION ENGINEER, S.C.D.

SCALE: 1/8" = 1'-0"

PROJECT NORTH

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CLIENT

CONSULTANT

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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

DEMOLITION SLAB PLAN

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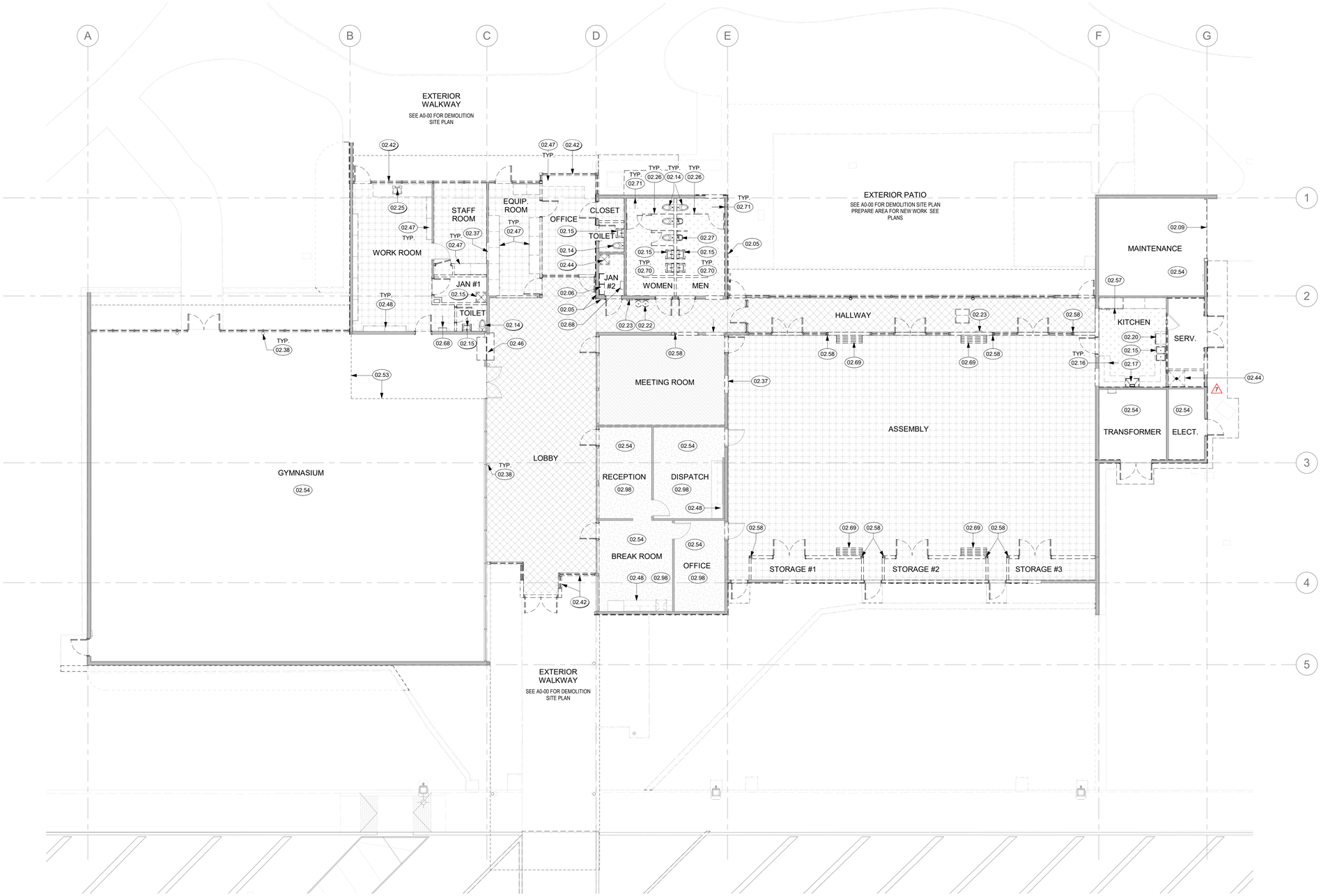

1 DEMO FLOOR PLAN - 1ST FLOOR
1/8" = 1'-0"

DEMOLITION NOTES

1. VERIFICATION OF EXISTING FIELD CONDITIONS IS REQUIRED PRIOR TO COMMENCEMENT OF DEMOLITION. ANY DEVIATION FROM ASSUMED EXISTING CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND OWNER IMMEDIATELY.
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7. REMOVE ALL INTERIOR SIGNAGE. PREPARE SURFACE FOR REPLACEMENT
8. SEE CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, AND LANDSCAPE DRAWINGS FOR ADDITIONAL DEMOLITION THAT MAY BE REQUIRED.
9. CONTRACTOR TO STRIP AS NEEDED, PATCH, REPAIR AND PREP ALL EXISTING SURFACES (FLOOR, WALLS, AND CEILING). RECEIVING NEW OR TOUCH UP FINISHES.
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12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF FINISHES AND/OR WALL BOARD AS REQUIRED FOR INSTALLATION OF ANY NEW ITEM(S) AND THEN REPLACE, PREP, PATCH AND/OR APPLY NEW FINISH(ES) AS PER PLANS OR (E) CONDITIONS.
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DEMOLITION PLAN SYMBOLS

- (E) WALL TO REMAIN
- (E) FINISH FLOOR TO REMAIN
- EXISTING DOOR TO REMAIN, PROTECT IN PLACE
- EXISTING STRUCTURAL COLUMNS TO REMAIN, PROTECT IN PLACE, SSD
- DEMO (E) STAMPED CONCRETE SURFACE, PREPARE SURFACE FOR NEW WORK
- DEMO (E) TILE AND GROUT IN ITS ENTIRETY, PREPARE SURFACE FOR NEW WORK
- DEMO (E) VINYL TILE IN ITS ENTIRETY, PREPARE SURFACE FOR NEW WORK
- DEMO (E) CARPET IN ITS ENTIRETY, PREPARE SURFACE FOR NEW WORK
- DEMO EXISTING WALL OR PORTION OF, STRUCTURE. SEE STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
- DEMO EXISTING CASEWORK, MISC. FINISHES, FIXTURES AND/OR EQUIPMENT, UNO.
- DEMO (E) STOREFRONT SYSTEM IN IT'S ENTIRETY, PREPARE AREA AND OPENING FOR NEW WORK
- DEMO EXISTING DOOR AND FRAME IN ITS ENTIRETY, UNO.

KEYNOTE LEGEND

02.05 REMOVE (E) BRICK VENEER AND SUBSTRATE AS REQUIRED. PREPARE FRAMING FOR FUTURE FINISH.
02.06 PROTECT IN PLACE (E) SHELVING TO REMAIN
02.09 REMOVE (E) ROLL UP DOOR, FRAME, AND ASSOCIATED ACCESSORIES. PREPARE OPENING FOR FUTURE WORK.
02.14 REMOVE (E) TOILET FIXTURE AND ACCESSORIES. S.P.D. FOR FUTURE ROUTING OF PLUMBING LINES.
02.15 REMOVE (E) LAVATORY. S.P.D. FOR FUTURE ROUTING OF PLUMBING LINES.
02.16 REMOVE (E) CASEWORK. PATCH AND REPAIR WALL/FLOOR AS NECESSARY FOR FUTURE WORK.
02.17 REMOVE (E) STOVE/OVEN. CAP ALL UTILITY LINES. S.P.D.
02.20 REMOVE (E) DISHWASHER. CUT AND CAP UTILITIES AS REQUIRED.
02.22 REMOVE (E) DRINKING FOUNTAIN. S.P.D. FOR FUTURE ROUTING OF PLUMBING LINES.
02.23 REMOVE (E) SURFACE MOUNTED FIRE EXTINGUISHER
02.25 REMOVE (E) SINK AND CAP ALL PLUMBING LINES. S.P.D.
02.26 REMOVE (E) TOILET PARTITIONS. PATCH AND REPAIR WALL AS NECESSARY FOR FUTURE WORK.
02.27 REMOVE (E) URNIAL
02.37 REMOVE PORTION OF (E) WALL AND PREPARE FOR INSTALLATION OF NEW FRAMING AND DOOR. SEE A7-11 FOR DOOR INFORMATION..
02.38 PREPARE INTUMESCENT COATED STEEL COLUMNS FOR PAINT, PNT-14
02.42 REMOVE (E) STOREFRONT SYSTEM, AND PREPARE FOR INSTALLATION OF (N) STOREFRONT SYSTEM. SEE A7-21 FOR STOREFRONT INFORMATION.
02.44 REMOVE (E) MOP SINK, PREPARE AREA FOR NEW WORK, S.P.D.
02.46 REMOVE (E) DISPLAY CASE, PREPARE OPENING FOR FUTURE INFILL
02.47 REMOVE (E) CASEWORK AND ACCESSORIES IN ITS ENTIRETY.
02.48 PROTECT IN PLACE (E) CASEWORK TO REMAIN
02.53 LINE OF SOFFIT ABOVE.
02.54 PROTECT IN PLACE (E) FINISH FLOOR TO REMAIN
02.57 REMOVE (E) REFRIGERATOR AND PROVIDE TO OWNER FOR RELOCATION.
02.58 REMOVE (E) STRUCTURAL MEMBER, S.S.D.
02.68 PROTECT IN PLACE (E) LADDER TO REMAIN.
02.69 REMOVE (E) OPERABLE PARTITION AND ITS ACCESSORIES IN ITS ENTIRETY.
02.70 REMOVE ALL RESTROOM EQUIPMENT AND ACCESSORIES IN ITS ENTIRETY.
02.71 REMOVE EXISTING TILE WALL FINISH AND GROUT, PREPARE SURFACE FOR NEW WORK.
02.98 REMOVE, STORE, AND REINSTALL ALL WORKSTATIONS AND FURNITURE ITEMS

1 4 8 16
SCALE: 1/8" = 1'-0"

PROJECT NORTH

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SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

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CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

DEMOLITION FLOOR PLAN

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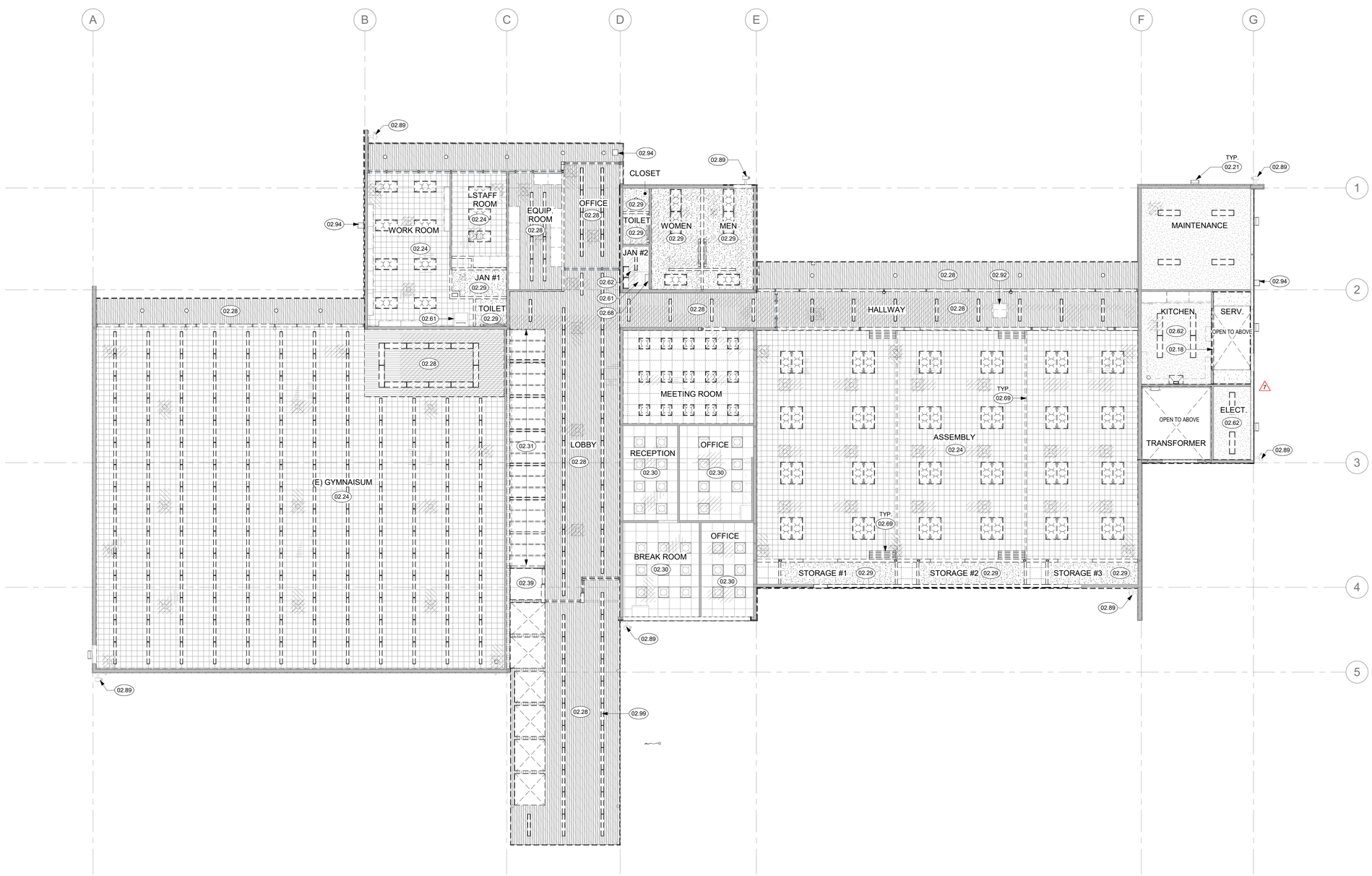

1 DEMO RCP - 1ST FLOOR
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12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF FINISHES AND/OR WALL BOARD AS REQUIRED FOR INSTALLATION OF ANY NEW ITEM(S) AND THEN REPLACE, PREP, PATCH AND/OR APPLY NEW FINISH(ES) AS PER PLANS OR (E) CONDITIONS.
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DEMOLITION RCP SYMBOLS

- (E) WALL TO REMAIN
- EXISTING STRUCTURAL COLUMNS TO REMAIN, PROTECT IN PLACE, SSD
- DEMO (E) 1x1 GLUE ON TILE DOWN TO SUBSTRATE, PREPARE SURFACE FOR NEW WORK
- DEMO (E) WOOD PLANKS DOWN TO SUBSTRATE, PREPARE SURFACE FOR NEW WORK
- DEMO (E) 2X2 SUSPENDED CEILING GRID AND ACT
- PROTECT IN PLACE 2X2 GRID, DEMO (E) 2X2 ACT ONLY
- (E) GYPSUM BOARD CEILING TO REMAIN, PROTECT IN PLACE
- DEMO (E) GYPSUM BOARD CEILING
- DEMO EXISTING WALL OR PORTION OF STRUCTURE. SEE STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
- DEMO EXISTING CASEWORK, MISC. FINISHES, FIXTURES AND/OR EQUIPMENT, UNO.
- DEMO (E) STOREFRONT SYSTEM IN ITS ENTIRETY, PREPARE AREA AND OPENING FOR NEW WORK
- DEMO (E) LIGHTING FIXTURE, SED.
- DEMO (E) MECHANICAL EQUIPMENT, SMD.

KEYNOTE LEGEND

02.18	REMOVE (E) WINDOW. PEREPARE OPENING FOR INFILL.
02.21	REMOVE (E) EXTERIOR WALL MOUNTED FIXTURES. PATCH SURFACE FOR FUTURE WORK.
02.24	REMOVE (E) 1X1 GLUE-ON TILES.
02.28	REMOVE EXISTING WOOD CEDAR SIDING AND SUBSTRATE AS NECESSARY.
02.29	REMOVE EXISTING GYPSUM BOARD CEILING
02.30	REMOVE EXISTING LAY IN TILES. PROTECT IN PLACE (E) SUSPENDED GRID DURING CONSTRUCTION.
02.31	REMOVE (E) SKYLIGHT. PREPARE OPENING FOR FUTURE INFILL WITH NEW STRUCTURE AND ROOFING.
02.39	PREPARE (E) ROOF OPENING FOR FUTURE INFILL WORK, REFER TO ROOF PLAN A4-11 FOR MORE INFORMATION.
02.61	PROTECT IN PLACE (E) ROOF HATCH AND LADDER TO REMAIN
02.62	PROTECT IN PLACE (E) GYPSUM BOARD CEILING TO REMAIN
02.68	PROTECT IN PLACE (E) LADDER TO REMAIN.
02.69	REMOVE (E) OPERABLE PARTITION AND ITS ACCESSORIES IN ITS ENTIRETY.
02.89	REMOVE (E) SECURITY CAMERA, PARTS AND ACCESSORIES IN ITS ENTIRETY, S.E.D.
02.92	REMOVE (E) ACCESS HATCH.
02.94	REMOVE (E) SPEAKER AND CAGE, PARTS AND ACCESSORIES IN ITS ENTIRETY.
02.99	REMOVE (E) LIGHT FIXTURES, S.E.D.

SCALE: 1/8" = 1'-0"

PROJECT NORTH

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JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

DEMOLITION REFLECTED CEILING PLAN

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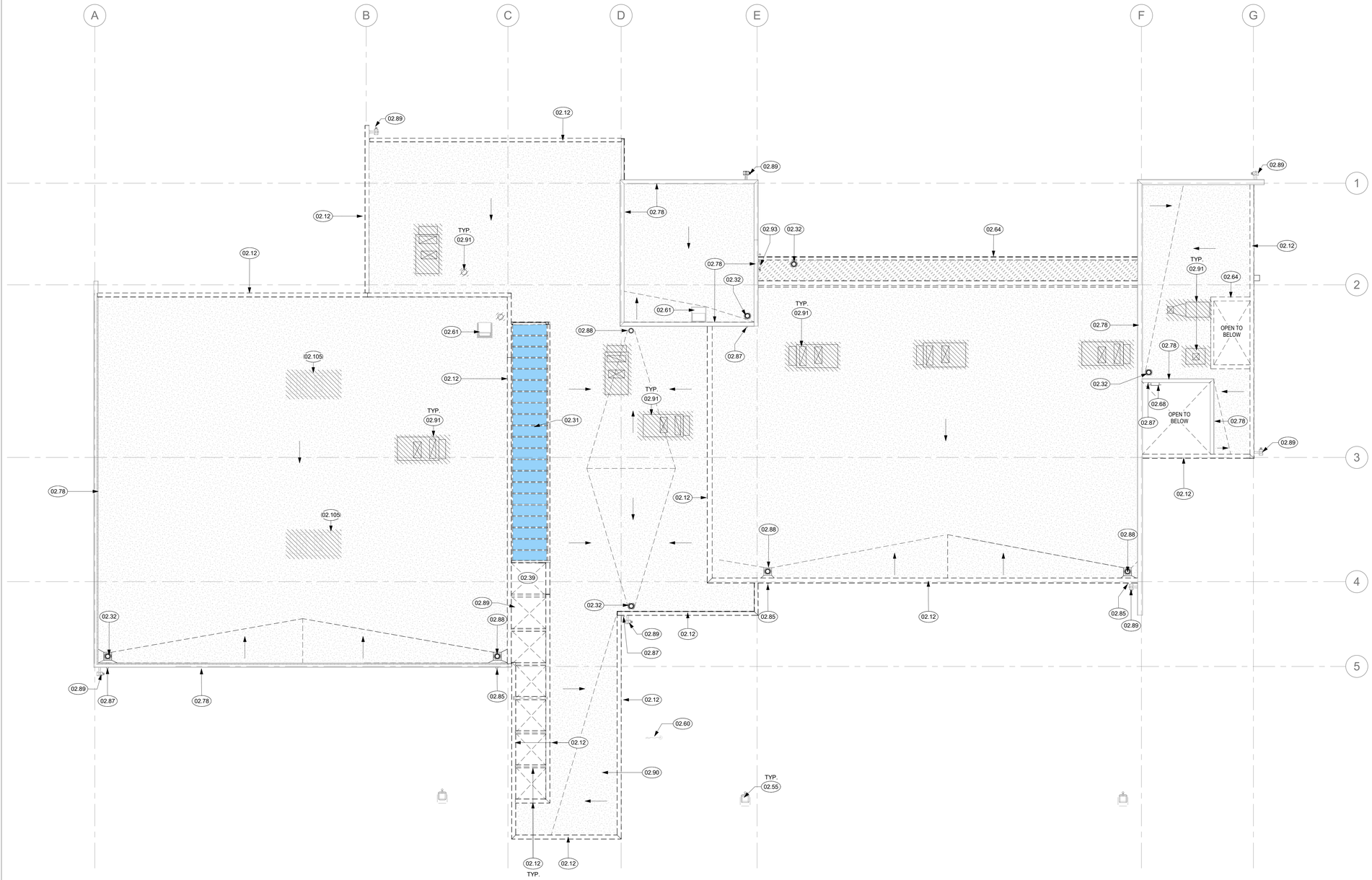

1 DEMO ROOF PLAN
1/8" = 1'-0"

DEMOLITION NOTES

1. VERIFICATION OF EXISTING FIELD CONDITIONS IS REQUIRED PRIOR TO COMMENCEMENT OF DEMOLITION. ANY DEVIATION FROM ASSUMED EXISTING CONDITIONS MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND OWNER IMMEDIATELY.
2. ALL EXISTING MPE SYSTEMS TO BE MADE SAFE AND UTILITY SERVICES TO BE SHUT OFF PRIOR TO COMMENCEMENT OF DEMOLITION.
3. ALL EXISTING STRUCTURE WALLS, FLOORS AND ROOF FRAMING TO REMAIN U.N.O., PROTECT ALL EXISTING ELEMENTS TO REMAIN DURING CONSTRUCTION.
4. CONTRACTOR TO REMOVE AND DISPOSE OF ALL DEMOLITION AND CONSTRUCTION DEBRIS PER THE CITY OF LAKEWOOD DEBRIS RECOVERY PROGRAM.
5. DEMOLITION PLAN IS INTENDED TO AID CONTRACTOR IN DETERMINING THE EXTENT OF THE NECESSARY WORK. IT DOES NOT NECESSARILY DEPICT THE ACTUAL, OR ALL OF THE DEMOLITION WORK. CONTRACTOR IS RESPONSIBLE FOR ALL DEMOLITION WORK REQUIRED TO COMPLETE THIS PROJECT. CONTRACTOR TO STUDY THESE CONSTRUCTION DOCUMENTS AND PERFORM A THOROUGH FIELD INVESTIGATION PRIOR TO BIDDING THE PROJECT. CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL REQUIRED ENGINEERED SHORING AND BRACING FOR THE PROJECT.
6. COORDINATE WITH OWNER PRIOR TO DEMOLITION TO CONFIRM WHICH ITEMS ARE TO BE REMOVED AND SALVAGED. THE CONTRACTOR IS RESPONSIBLE FOR DISCARDING ALL CONSTRUCTION DEBRIS.
7. REMOVE ALL INTERIOR SIGNAGE. PREPARE SURFACE FOR REPLACEMENT
8. SEE CIVIL, STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, AND LANDSCAPE DRAWINGS FOR ADDITIONAL DEMOLITION THAT MAY BE REQUIRED.
9. CONTRACTOR TO STRIP AS NEEDED, PATCH, REPAIR AND PREP ALL EXISTING SURFACES (FLOOR, WALLS, AND CEILING). RECEIVING NEW OR TOUCH UP FINISHES.
10. PATCH AND REPAIR ALL WALLS, FLOORS, AND STRUCTURE TO REMAIN THAT WERE DAMAGED DURING DEMOLITION PROCESS.
11. ALL FLOOR FINISHES TO BE REMOVED TO (E) CONCRETE SLAB U.N.O. PREPARE FLOORS FOR (N) FLOOR FINISHES.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL OF FINISHES AND/OR WALL BOARD AS REQUIRED FOR INSTALLATION OF ANY NEW ITEM(S) AND THEN REPLACE, PREP, PATCH AND/OR APPLY NEW FINISH(ES) AS PER PLANS OR (E) CONDITIONS.
13. FOR INFORMATION ON HAZARDOUS MATERIALS REMOVAL REFER TO HAZARDOUS MATERIAL REPORT IN SPECIFICATIONS
14. SAW CUT ALL CONCRETE TO BE REMOVED.
15. REMOVE AND REINSTALL: DETACH ITEMS FROM EXISTING CONSTRUCTION, PREPARE THEM FOR REUSE, PROTECT AND STORE AS REQUIRED, AND REINSTALL THEM WHERE INDICATED.
16. PRIOR TO THE START OF DEMOLITION, ALL REMEDIATION WORK LISTED IN THE ENVIRONMENTAL REPORT IS TO BE COMPLETED BY THE CONTRACTOR. REFER TO THE HAZARD REPORT BY OMEGA IN PROJECT MANUAL.
17. PRIOR TO THE START OF DEMOLITION, BEE MITIGATION AND REMOVAL TO COMPLETED BY OWNER. CONTRACTOR TO NOTIFY CLIENT IF ANY REMNANTS OF BEE REMOVAL REMAINS AND TO ASSIST IN COORDINATING THE ADDITIONAL REMOVAL.

DEMOLITION ROOF PLAN SYMBOLS

- DEMO AND REMOVE (E) BUILT-UP ROOFING. SHEATHING AND FRAMING TO REMAIN. REPAIR AND/OR REPLACE SHEATHING WHERE DAMAGED.
- DEMO AND REMOVE (E) ROOF AND FRAMING IN ITS ENTIRETY.
- DIRECTION OF (E) ROOF SLOPE
- OPEN TO BELOW

KEYNOTE LEGEND

02.12	REMOVE (E) PARAPET. PREPARE ROOF EDGE FOR FUTURE WORK.
02.31	REMOVE (E) SKYLIGHT. PREPARE OPENING FOR FUTURE INFILL WITH NEW STRUCTURE AND ROOFING.
02.32	REMOVE (E) ROOF DRAIN. DRAIN LINES TO REMAIN S.P.D.
02.39	PREPARE (E) ROOF OPENING FOR FUTURE INFILL WORK, REFER TO ROOF PLAN A4-11 FOR MORE INFORMATION.
02.55	PROTECT IN PLACE (E) POLE SITE LIGHTING TO REMAIN
02.60	PROTECT IN PLACE (E) FLAGPOLE TO REMAIN
02.61	PROTECT IN PLACE (E) ROOF HATCH AND LADDER TO REMAIN
02.64	REMOVE (E) PARAPET WALL IN ITS ENTIRETY. PATCH AND REPAIR CONNECTION TO (E) WALL TO REMAIN AS NEEDED FOR NEW WORK.
02.68	PROTECT IN PLACE (E) LADDER TO REMAIN.
02.78	PROTECT IN PLACE (E) PARAPET CAP TO REMAIN AND PREPARE SURFACE FOR NEW FINISH.
02.85	REMOVE (E) SCUPPER IN ITS ENTIRETY. SCUPPER WILL NOT BE RE-INSTALLED.
02.87	REMOVE (E) SCUPPER. PREPARE OPENING FOR INSTALLATION OF NEW SCUPPER.
02.88	REMOVE (E) DRAIN BODY AND PREPARE SURFACE FOR FUTURE WORK
02.89	REMOVE (E) SECURITY CAMERA. PARTS AND ACCESSORIES IN ITS ENTIRETY, S.E.D.
02.90	VERIFY EXISTING ROOF FRAMING CONDITION AND DEFLECTION AT CANOPY. PREPARE FRAMING FOR FUTURE REPAIR AND REINFORCEMENT.
02.91	REMOVE (E) MECHANICAL EQUIPMENT, PARTS AND ACCESSORIES IN ITS ENTIRETY, U.N.O. S.M.D.
02.93	REMOVE (E) DOWNSPOUT.
02.105	EXISTING MECHANICAL UNIT TO REMAIN, PROTECT IN PLACE. S.M.D.

SCALE: 1/8" = 1'-0"

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CHECK	**Checker**

DEMOLITION ROOF PLAN

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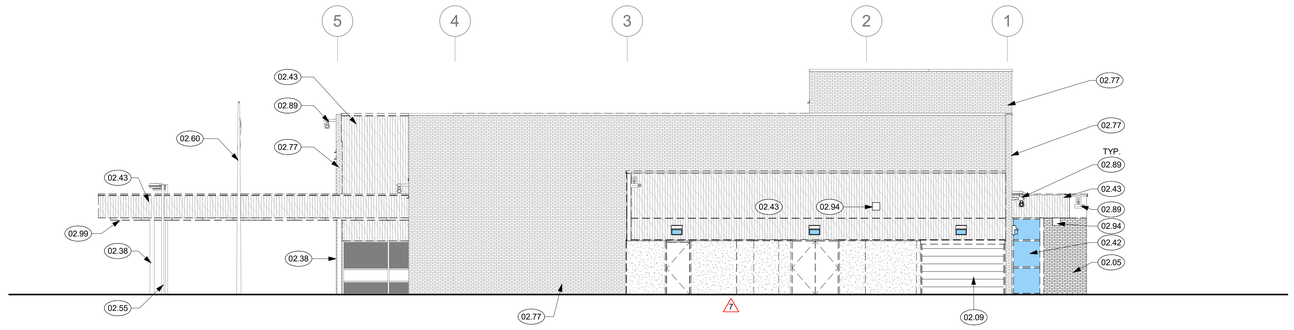
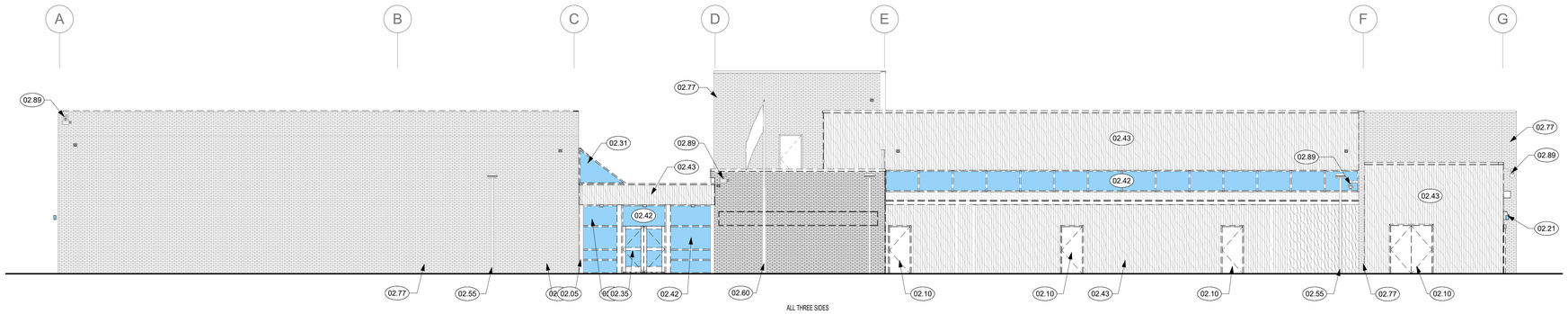


4 DEMOLITION - EAST ELEVATION
1/8" = 1'-0"



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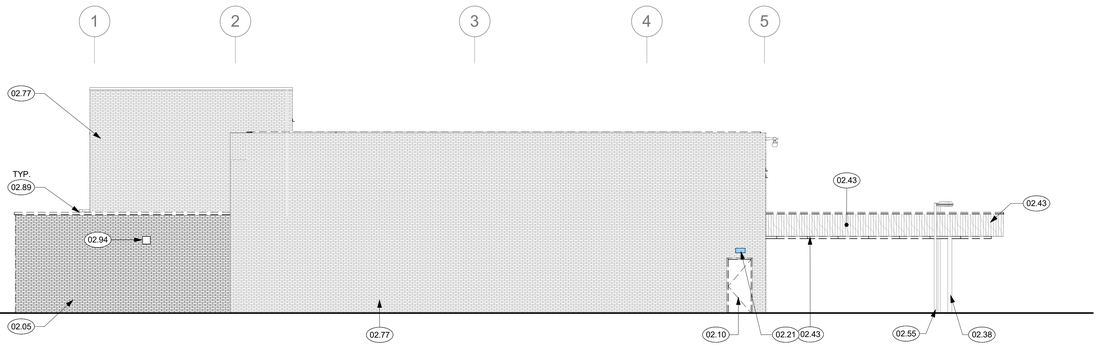
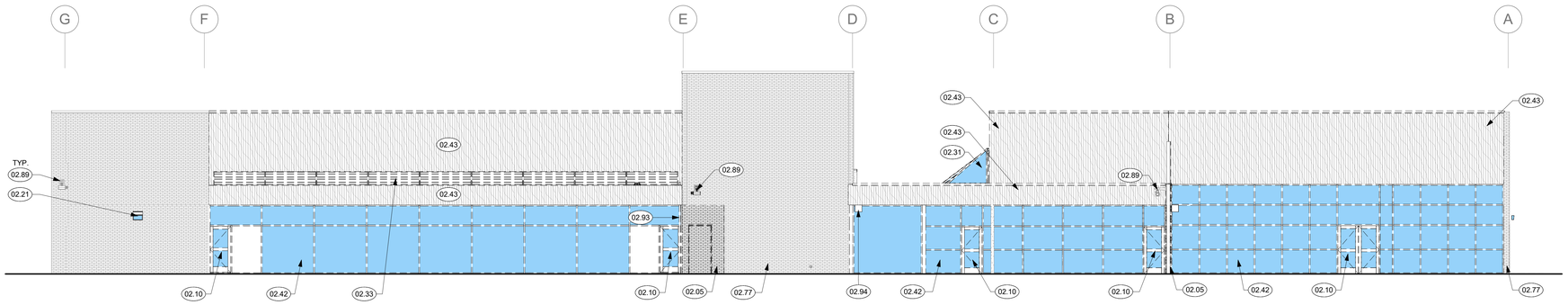
1/8" = 1'-0"



2 DEMOLITION ELEVATION - WEST
1/8" = 1'-0"



1 DEMOLITION ELEVATION - NORTH
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DEMOLITION NOTES

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KEYNOTE LEGEND

02.05	REMOVE (E) BRICK VENEER AND SUBSTRATE AS REQUIRED. PREPARE FRAMING FOR FUTURE FINISH.
02.09	REMOVE (E) ROLL UP DOOR, FRAME, AND ASSOCIATED ACCESSORIES. PREPARE OPENING FOR FUTURE WORK.
02.10	REMOVE (E) DOOR, PREP AND REPAIR FRAME AS NEEDED FOR INSTALLATION OF NEW DOOR.
02.21	REMOVE (E) EXTERIOR WALL MOUNTED FIXTURES. PATCH SURFACE FOR FUTURE WORK.
02.31	REMOVE (E) SKYLIGHT. PREPARE OPENING FOR FUTURE INFILL WITH NEW STRUCTURE AND ROOFING.
02.33	REMOVE (E) MECHANICAL LOUVERS, S.M.D.
02.35	REMOVE (E) BRICK VENEER, SUBSTRATE, AND FRAMING. PREPARE OPENING FOR FUTURE WORK.
02.38	PREPARE INTUMESCENT COATED STEEL COLUMNS FOR PAINT, PNT-14
02.42	REMOVE (E) STOREFRONT SYSTEM, AND PREPARE FOR INSTALLATION OF (N) STOREFRONT SYSTEM. SEE A7-21 FOR STOREFRONT INFORMATION.
02.43	REMOVE (E) EXTERIOR WOOD FINISH. REPAIR WALL AS NECESSARY FOR INSTALLATION OF (N) FINISHES.
02.55	PROTECT IN PLACE (E) POLE SITE LIGHTING TO REMAIN
02.60	PROTECT IN PLACE (E) FLAGPOLE TO REMAIN
02.77	PROTECT (E) BRICK VENEER TO REMAIN. PREPARE SURFACE FOR FINISH. SEE AS SERIES SHEETS FOR EXTERIOR ELEVATIONS.
02.89	REMOVE (E) SECURITY CAMERA, PARTS AND ACCESSORIES IN ITS ENTIRETY. S.E.D.
02.93	REMOVE (E) DOWNSPOUT.
02.94	REMOVE (E) SPEAKER AND CAGE. PARTS AND ACCESSORIES IN ITS ENTIRETY.
02.99	REMOVE (E) LIGHT FIXTURES, S.E.D.

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SCALE: 1/8" = 1'-0"

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DEMOLITION EXTERIOR ELEVATIONS

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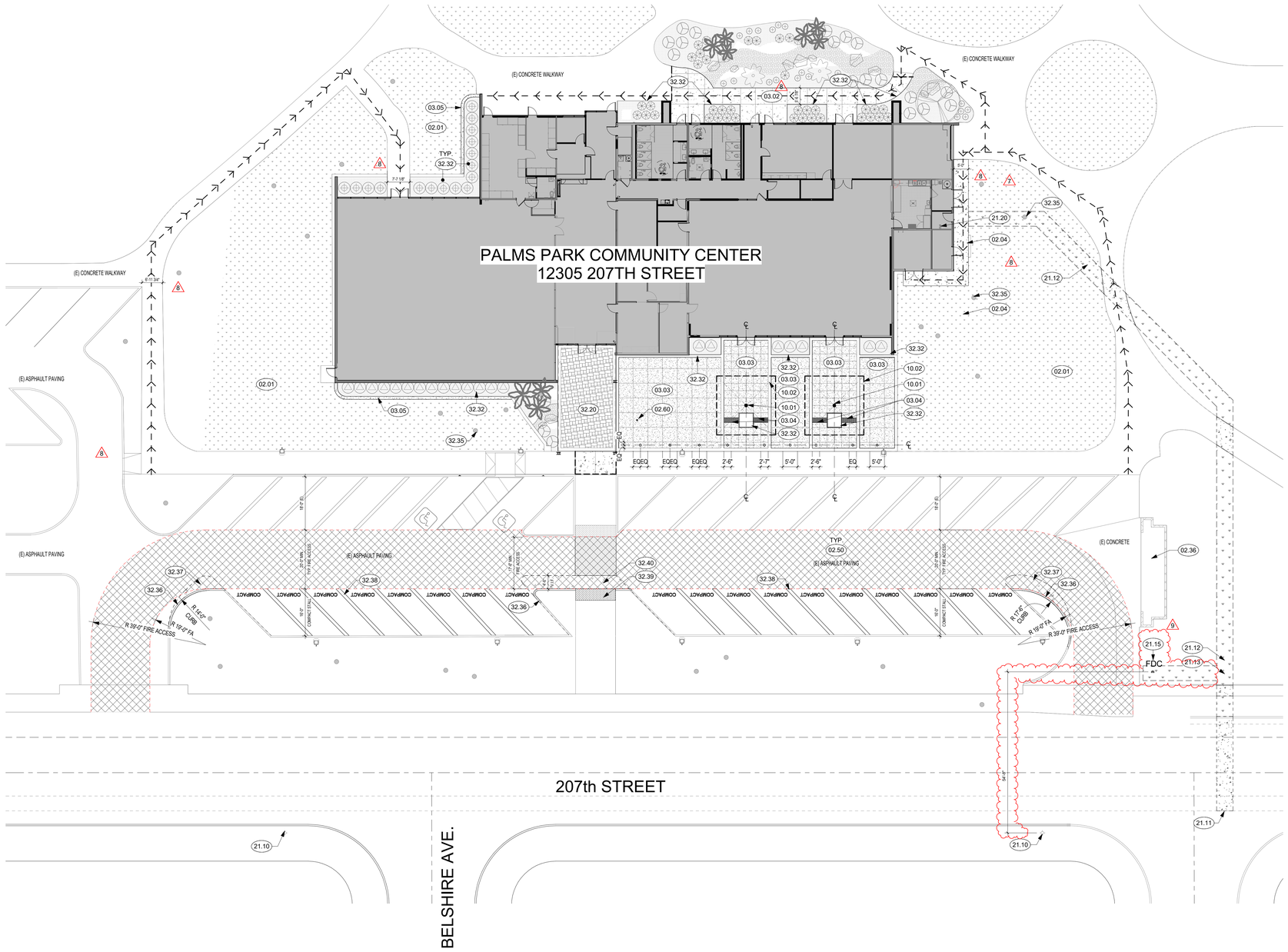

1 SITE PLAN
1/16" = 1'-0"

SITE PLAN NOTES

1. THIS SITE PLAN IS NOT A SURVEY. IT IS PROVIDED FOR BUILDING AND SITE WORK LAYOUT ONLY. THE CONTRACTOR SHALL VERIFY ON SITE ALL GRADES, EXISTING IMPROVEMENTS, PROPERTY LINES, EASEMENTS, SETBACKS, UTILITIES, AND SUBSTRUCTURES WHERE DISCREPANCIES OCCUR, CONTACT ARCHITECT.
2. FINISH GRADE SHALL PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING, SEE SOILS REPORT FOR ANY SPECIFIC REQUIREMENTS.
3. ALL ROOF DRAINAGE SHALL BE PIPED TO AN APPROVED DRAINAGE FACILITY, S.C.D.
4. IRRIGATION SYSTEM SHALL BE DESIGNED TO PREVENT THE SATURATION OF SOIL ADJACENT TO BUILDING.
5. WHERE DISCREPANCIES BETWEEN SOILS REPORT AND ARCHITECT'S DRAWINGS OCCUR, CONTACT ARCHITECT.
6. PROVIDE EXPANSION AND CONTROL JOINTS IN ALL EXTERIOR CONCRETE SLABS. SPACING OF JOINTS SHALL BE PER INDUSTRY STANDARD, S.L.D. & S.C.D.
7. FOR INFORMATION & SCOPE NOT NOTED SEE CIVIL AND LANDSCAPE DRAWINGS.
8. FOR GENERAL SITE ACCESSIBILITY REQUIREMENT REF. G1-41 SERIES SHEETS
9. FIRE DEPARTMENT VEHICULAR ACCESS ROADS MUST BE INSTALLED AND MAINTAINED IN A SERVICEABLE MANNER PRIOR TO AND DURING THE TIME OF CONSTRUCTION. FIRE CODE 503.1.1
10. PROVIDE APPROVED SIGNS OR OTHER APPROVED NOTICES OR MARKINGS THAT INCLUDE THE WORDS NO PARKING - FIRE LANE. SIGNS SHALL HAVE A MINIMUM DIMENSION OF 12 INCHES WIDE BY 18 INCHES HIGH AND HAVE RED LETTERS ON A WHITE REFLECTIVE BACKGROUND. SIGNS SHALL BE PROVIDED FOR FIRE APPARATUS ACCESS ROADS, TO CLEARLY INDICATE THE ENTRANCE TO SUCH ROAD, OR PROHIBIT THE OBSTRUCTION THEREOF AND AT INTERVALS, AS REQUIRED BY THE FIRE INSPECTOR. FIRE CODE 503.3.
11. FIRE APPARATUS ACCESS ROADS SHALL BE IDENTIFIED WITH APPROVED SIGNS. TEMPORARY SIGNS SHALL BE INSTALLED AT EACH STREET INTERSECTION WHEN CONSTRUCTION OF NEW ROADWAYS ALLOWS PASSAGE BY VEHICLES. SIGNS SHALL BE OF AN APPROVED SIZE, WEATHER RESISTANT AND BE MAINTAINED UNTIL REPLACED BY PERMANENT SIGNS. FIRE CODE 505.2
12. FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED ON THE STREET-ADDRESS SIDE OF BUILDINGS, FACING APPROVED FIRE APPARATUS ACCESS ROADS, WITHIN 150 FEET (VIA VEHICULAR ACCESS) OF AN ACCESSIBLE PUBLIC FIRE HYDRANT, AND AS CLOSE TO THE STREET CURB FACE AS POSSIBLE, FULLY VISIBLE, AND RECOGNIZABLE FROM THE STREET. FIRE APPARATUS ACCESS ROAD OR NEAREST POINT OF FIRE DEPARTMENT VEHICLE ACCESS OR AS OTHERWISE APPROVED BY THE FIRE CODE OFFICIAL. FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED A MINIMUM OF 25 FEET (7,620 MM) FROM THE STRUCTURE. WHEN THIS DISTANCE CANNOT BE ACHIEVED, A MINIMUM TWO-HOUR, FIRE-RESISTIVE WALL SHALL BE PROVIDED FOR THE STRUCTURE WITH NO OPENINGS IN THE WALL, FOR 25 FEET (7,620 MM) IN EITHER DIRECTION FROM THE FIRE DEPARTMENT CONNECTION. THE REQUIRED FIRE-RESISTIVE CONSTRUCTION AND LACK OF OPENINGS SHALL EXTEND FOR THE FULL HEIGHT OF THE WALL OR BUILDING AS DETERMINED BY THE FIRE CODE OFFICIAL. THE FIRE CODE OFFICIAL MAY ALLOW SUFFICIENTLY PROTECTED OVERHEAD OPENINGS. FIRE DEPARTMENT CONNECTIONS SHALL BE LOCATED NOT LESS THAN 24 INCHES (609.6 MM) NOR MORE THAN 42 INCHES (1,066.8 MM) ABOVE GRADE. FIRE CODE 912.2.1

SITE PLAN SYMBOLS

- EXISTING CONCRETE PAVING, PROTECT IN PLACE
- NEW CONCRETE PAVING, S.C.D. AND S.L.D.
- REPLACE TURF, S.C.D. AND S.L.D.
- STRUCTURAL COLUMNS, S.S.D.
- NEW PLANTING, S.L.D.
- FIRE DEPARTMENT VEHICULAR ACCESS
- FIRE DEPARTMENT WALKING ACCESS, 5'-0" MIN CLR PER CFC 504.1, 2% MAX SLOPE.

FIRE FLOW NOTES

THE REQUIRED FIRE FLOW IS BASED ON THE FOLLOWING CALCULATION:

- TYPE OF CONSTRUCTION PER THE BUILDING CODE: TYPE V-B
- FIRE-FLOW CALCULATION AREA AREA: 14660 SQ. FT
- FIRE FLOW BASED ON THE FIRE-FLOW CALCULATION AREA: 3250 GPM
- REDUCTION FOR FIRE SPRINKLERS (MAXIMUM 50%): 1625 GPM
- TOTAL FIRE FLOW REQUIRED: 1625 GPM

KEYNOTE LEGEND

02.01	PROTECT IN PLACE (E) TURF TO REMAIN
02.04	PROTECT IN PLACE (E) UNDERGROUND UTILITY
02.36	PROTECT (E) TRASH ENCLOSURE DURING CONSTRUCTION. TRASH ENCLOSURE TO SUPPORT WARMING KITCHEN.
02.50	PROTECT IN PLACE (E) A.C. PAVING TO REMAIN
02.60	PROTECT IN PLACE (E) FLAGPOLE TO REMAIN
03.02	CONCRETE HARDSCAPE, S.C.D. AND S.L.D.
03.03	INTEGRAL COLOR CONCRETE, S.C.D. AND S.L.D.
03.04	CAST IN PLACE CONCRETE BENCH, S.L.D.
03.05	CONCRETE MOW CURB, S.L.D.
10.01	PROVIDE, EMBED UMBRELLA SLEEVE
10.02	UMBRELLA, S.L.D.
21.10	EXISTING FIRE HYDRANT
21.11	EXISTING UNDERGROUND 6" WATER LINE, S.C.D.
21.12	INSTALL UNDERGROUND WATER SERVICE LINE TO MAIN FOR FIRE PROTECTION SYSTEM, FINAL ROUTING TO BE COORDINATED, S.C.D.
21.13	INSTALL BACKFLOW ASSEMBLY, S.C.D.
21.15	STANDALONE FIRE DEPARTMENT CONNECTION, FINAL LOCATION SHALL BE DETERMINED BY SPINKLER UNIT
21.20	FIRE RISER, SPD
32.20	BRICK PAVERS, S.L.D.
32.32	PRE-FABRICATED GFRC RAISED PLANTERS WITH STORM DRAIN TIE IN FOR OVERFLOW, S.L.D. AND S.C.D.
32.35	PROTECT EXISTING TREES TO REMAIN IN PLACE DURING CONSTRUCTION
32.36	CONCRETE CURB, ALIGN TO EXISTING INSTALLED PER LAKEWOOD PUBLIC WORKS STANDARD
32.37	ASPHALT PAVING INFILL INSTALLED PER LAKEWOOD PUBLIC WORKS STANDARDS
32.38	RESTRIPE PARKING STALLS TO CONFORM TO LAKEWOOD PUBLIC WORK STANDARDS FOR COMPACT STALLS
32.39	RELOCATE (E) TACTILE STRIP ON TO EXISTING BRICK PAVERS
32.40	ASPHALT PAVING INFILL TO MEET ACCESSIBLE PATH OF TRAVEL REQUIREMENTS PER CBC AND INSTALLED PER LAKEWOOD PUBLIC WORKS STANDARDS

SCALE: 1/16" = 1'-0"

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SITE PLAN

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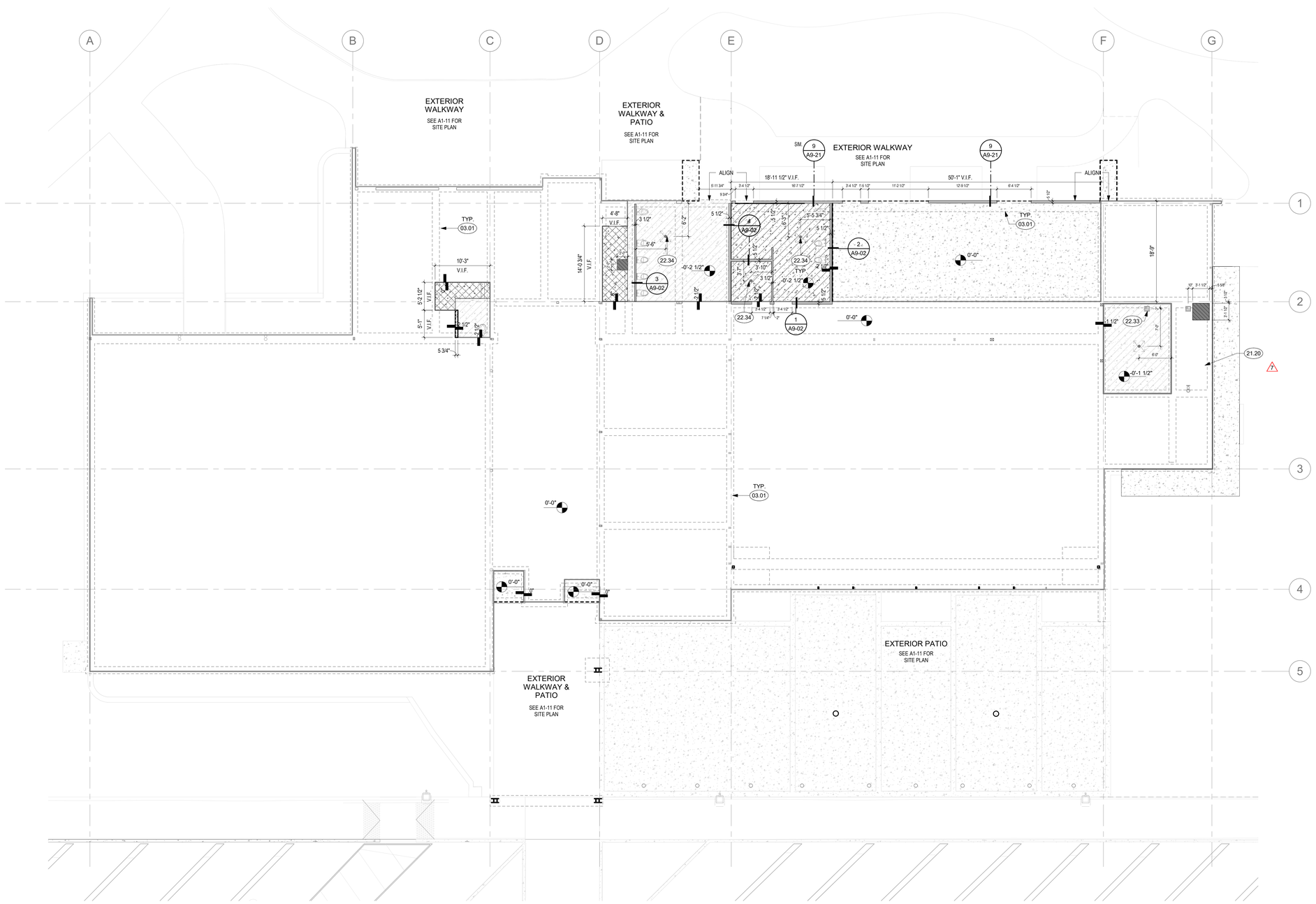

1 SLAB PLAN - 1ST FLOOR
1/8" = 1'-0"

SLAB PLAN GENERAL NOTES

1. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE LOCATION AND CONSTRUCTION OF ALL UNDER SLAB UTILITIES
2. FOR UNDERGROUND UTILITY LOCATIONS S.C.D., S.P.D., AND S.E.D.
3. FOR UNDER SLAB UTILITIES SUCH AS FLOOR DRAINS, ROOF DRAINAGE, STORM AND SANITARY SEWER, ETC., S.P.D.
4. FOR ALL FINISH GRADES AND SITE RETAINING WALL HEIGHT, S.C.D.
5. VERIFY LOCATION AND HEIGHTS OF HARDSCAPE SLABS, RAMPS AND RETAINING WALLS WITH LANDSCAPE / CIVIL PRIOR TO SETTING HEIGHTS OF FOOTINGS, RAISED CURBS AND SLABS.
6. FOR CONSTRUCTION SLAB JOINTS SEE STRUCTURAL FOR DETAILS. ALIGN CONSTRUCTION JOINTS WITH WALLS AND TILE JOINTS. PROVIDE SHOP DRAWINGS FOR APPROVAL INDICATING LOCATION OF CONSTRUCTION JOINTS PRIOR TO PLACEMENT OF SLAB
7. PROVIDE SLAB ON GRADE VAPOR BARRIER - TYP. PROVIDE AT INTERIOR SPACES SLAB ON GRADE - SEE SPECIFICATIONS. REFER TO MANUFACTURER'S WRITTEN LITERATURE AND INSTALLATION INSTRUCTIONS FOR APPLICABLE DETAILS NOT PROVIDED

SLAB PLAN SYMBOLS

- STRUCTURAL COLUMNS, S.S.D.
- CONCRETE CURB AT +5-1/2", U.O.N., S.S.D.
- CONCRETE PAD AT +4", U.O.N., S.S.D.
- (E) CONCRETE SLAB TO REMAIN, S.S.D.
- NEW CONCRETE SLAB, S.S.D
- (E) DEPRESSED SLAB, V.I.F. DEPRESSION, S.S.D.
- NEW DEPRESSED SLAB, S.S.D.
- TOPPING SLAB ON (E) SLAB
- ELEVATION AT RECESSED SLAB AREA
- TYPICAL FLOOR DRAIN, S.P.D. SLOPE FINISH FLOOR TO DRAIN 1/16" ; 1'-0" MIN., U.O.N.

KEYNOTE LEGEND

03.01	STRUCTURAL FOOTING, S.S.D.
7	21.20	FIRE RISER, SPD
	22.33	FLOOR SINK, S.P.D.
	22.34	FLOOR DRAIN, S.P.D.

SCALE: 1/8" = 1'-0"

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SLAB PLAN

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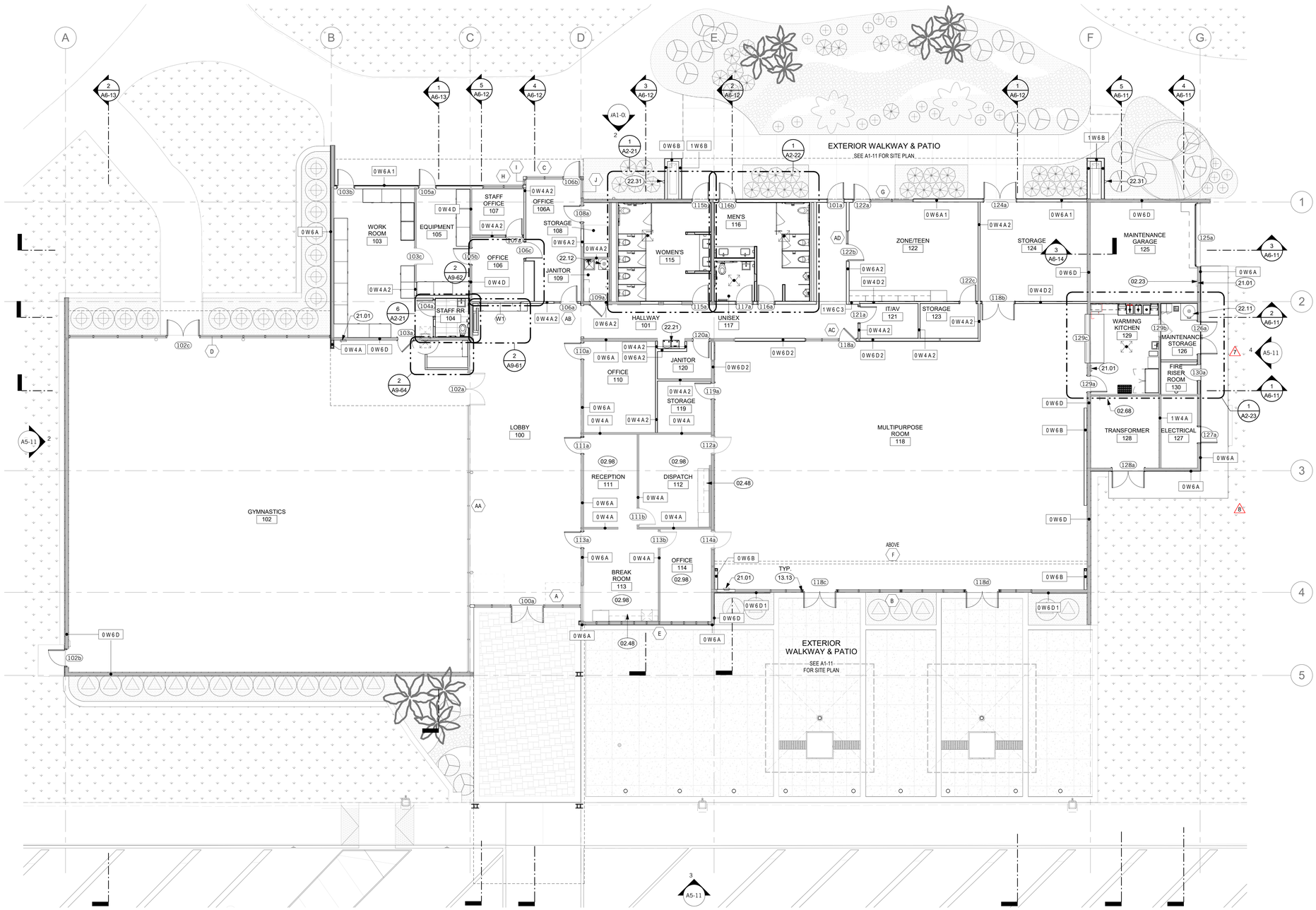

1 ANNOTATION PLAN - 1ST FLOOR
1/8" = 1'-0"

FLOOR PLAN NOTES

1. FOR DIMENSIONS, REFER TO DIMENSION PLAN A2-12
2. WALL HEIGHTS TYPICAL TO BOTTOM OF FLOOR OR ROOF FRAMING EXCEPT WHERE INDICATED ON STRUCTURAL DRAWINGS OR WHERE INDICATED AS FIRE RATED OR SOUND CONSTRUCTION (U.O.N.)
3. FOR STUD SIZES AND MATERIAL SEE A2-11 ANNOTATION PLANS FOR WALL TAGS
4. ALL EXTERIOR WALLS AND INTERIOR BEARING WALLS SHALL BE CONSTRUCTED OF 6" WOOD STUDS @ 16" O.C. (U.O.N.) - S.S.D.
5. TYP. INTERIOR WALL 5/8" TYPE 'X' GYP. BD. (U.O.N.).
6. ALL SHEATHING SURFACE PLANES TO BE CONTINUOUS. ALL GYPSUM BOARD PARTITIONS SHALL BE TAPED AND SANDED SMOOTH WITH NO VISIBLE JOINTS.
7. ALL INTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 4" MINIMUM AND ALL EXTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 6" MINIMUM U.O.N. FOR NOTES AND ADDITIONAL INFORMATION.
8. THE CONTRACTOR SHALL PATCH AND REPAIR ALL SURFACES TO MATCH ADJACENT OR ADJOINING SURFACES WHEREVER REQUIRED.
9. PROTECT FROM FREEZING, INSULATE AND WRAP ALL PLUMBING PIPES, FITTINGS AND OTHER ITEMS EXPOSED TO AN EXTERIOR WALL/ SOFFIT OR ROOF SURFACE.
10. PROVIDE BACKING IN ALL WALLS AS REQUIRED FOR SHELVES, CABINETS, BRACKETS, GRAB BARS, HANDRAILS, ETC.
11. PROVIDE FIRE BLOCKING AND DRAFT STOPPING AT ALL UNSPRINKLERED COMBUSTIBLE CONSTRUCTION IN STUD WALLS, CONCEALED SPACES, FURRED AREAS (10'-0" MAX HORIZONTAL AND VERTICAL INTERVALS) AT FLOOR / CEILING AND ROOF / CEILING AND OTHER LOCATIONS PER CBC 718.2
12. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 4: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT.
    LEVEL 5: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.
13. FOR INTERIOR FINISHES, SEE FINISH SCHEDULE A7-31
14. PROVIDE VENTILATION AT ALL EXTERIOR COLUMNS, SOFFITS AND WALLS (IF UNINSULATED). PROVIDE 6 SQ. IN / 100SF MIN.
15. FOR FIRE RATED ASSEMBLY LOCATIONS OF WALL PARTITIONS, REFER TO G3-02 & G3-03.
16. PROVIDE MIN. R-19 THERMAL INSULATION AT ALL EXTERIOR WALLS.

FLOOR PLAN SYMBOLS

- WALL FRAMING, SEE PARTITION SCHEDULE
- EXISTING WALL STRUCTURE TO REMAIN
- FE — SEMI RECESSED FIRE EXTINGUISHER CABINET WITH FIRE EXTINGUISHER.
- EXISTING STRUCTURAL COLUMNS, S.S.D.
- 0W4C — WALL TYPE - SEE PARTITION SCHEDULE ON A9-00
- A — WINDOW TYPE - SEE SCHEDULE, SEE A721
- 101A — DOOR TYPE - SEE SCHEDULE, SEE A711
- 101 — ROOM NUMBER
- HB — HOSE BIB - S.P.D.

KEYNOTE LEGEND

02.23 REMOVE (E) SURFACE MOUNTED FIRE EXTINGUISHER
02.48 PROTECT IN PLACE (E) CASEWORK TO REMAIN
02.68 PROTECT IN PLACE (E) LADDER TO REMAIN.
02.98 REMOVE, STORE, AND REINSTALL ALL WORKSTATIONS AND FURNITURE ITEMS
13.13 (E) STEEL COLUMN TO REMAIN
21.01 SEMI-RECESSED FIRE EXTINGUISHER CABINET
22.11 TANK WATER HEATER ON 4" CONCRETE CURB, SERVING WARMING KITCHEN, S.P.D.
22.12 TANK WATER HEATER ON 6" CONCRETE CURB, S.P.D.
22.21 HI-LOW DRINKING FOUNTAIN AND BOTTLE FILL STATION, S.P.D.
22.31 OVERFLOW NOZZLE, S.P.D.

SCALE: 1/8" = 1'-0"

PROJECT NORTH

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BID SET 06.03.25

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JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

ANNOTATION PLAN

SHEET
A2-11

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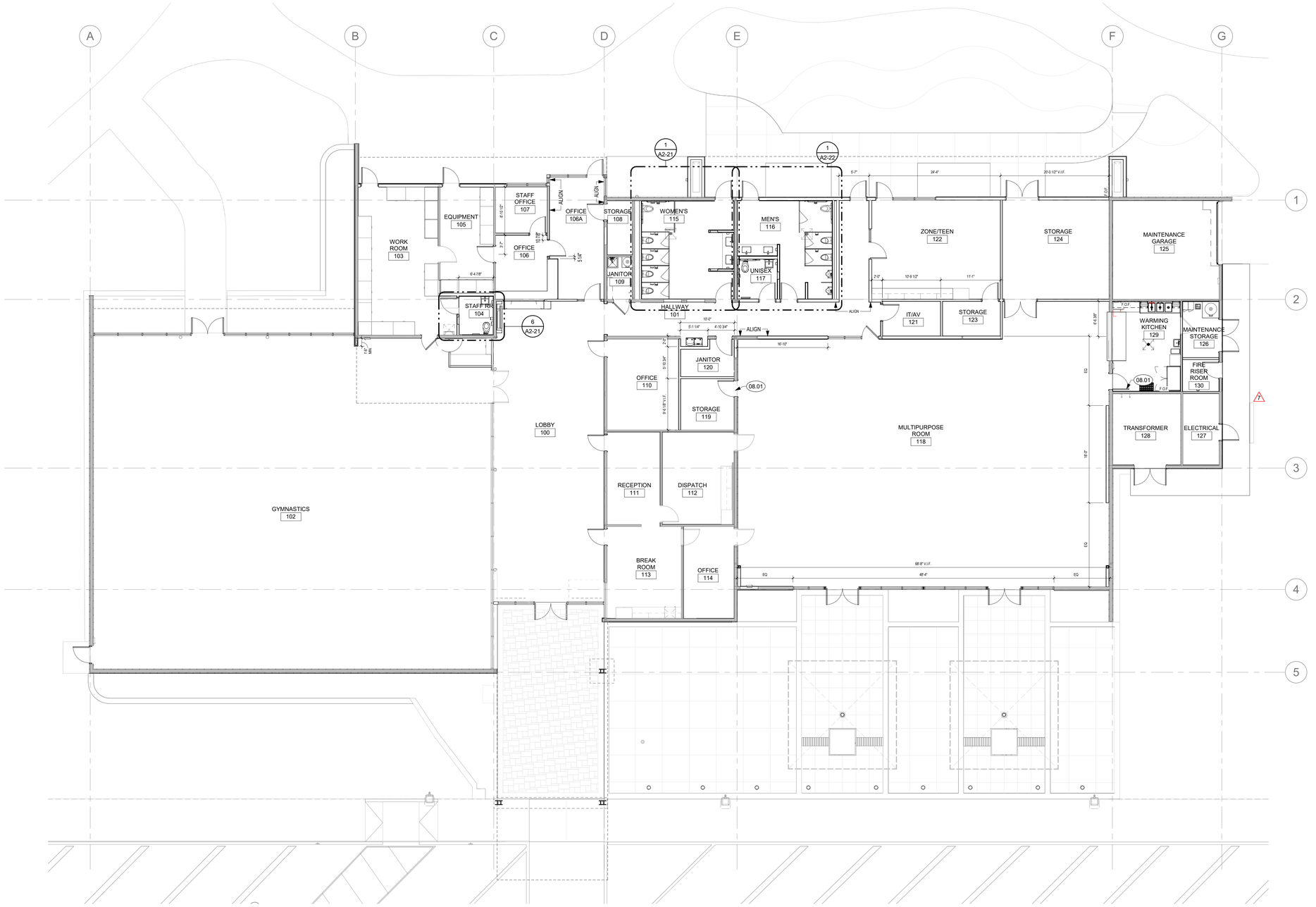

1 DIMENSION PLAN - 1ST FLOOR
1/8" = 1'-0"

FLOOR PLAN NOTES

1. FOR DIMENSIONS, REFER TO DIMENSION PLAN A2-12
2. WALL HEIGHTS TYPICAL TO BOTTOM OF FLOOR OR ROOF FRAMING EXCEPT WHERE INDICATED ON STRUCTURAL DRAWINGS OR WHERE INDICATED AS FIRE RATED OR SOUND CONSTRUCTION (U.O.N.)
3. FOR STUD SIZES AND MATERIAL SEE A2-11 ANNOTATION PLANS FOR WALL TAGS
4. ALL EXTERIOR WALLS AND INTERIOR BEARING WALLS SHALL BE CONSTRUCTED OF 6" WOOD STUDS @ 16" O.C. (U.O.N.) - S.S.D.
5. TYP. INTERIOR WALL 5/8" TYPE 'X' GYP. BD. (U.O.N.).
6. ALL SHEATHING SURFACE PLANES TO BE CONTINUOUS. ALL GYPSUM BOARD PARTITIONS SHALL BE TAPED AND SANDED SMOOTH WITH NO VISIBLE JOINTS.
7. ALL INTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 4" MINIMUM AND ALL EXTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 6" MINIMUM U.O.N. FOR NOTES AND ADDITIONAL INFORMATION.
8. THE CONTRACTOR SHALL PATCH AND REPAIR ALL SURFACES TO MATCH ADJACENT OR ADJOINING SURFACES WHEREVER REQUIRED.
9. PROTECT FROM FREEZING, INSULATE AND WRAP ALL PLUMBING PIPES, FITTINGS AND OTHER ITEMS EXPOSED TO AN EXTERIOR WALL/ SOFFIT OR ROOF SURFACE.
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11. PROVIDE FIRE BLOCKING AND DRAFT STOPPING AT ALL UNSPRINKLERED COMBUSTIBLE CONSTRUCTION IN STUD WALLS, CONCEALED SPACES, FURRED AREAS (10'-0" MAX HORIZONTAL AND VERTICAL INTERVALS) AT FLOOR / CEILING AND ROOF / CEILING AND OTHER LOCATIONS PER CBC 718.2
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14. PROVIDE VENTILATION AT ALL EXTERIOR COLUMNS, SOFFITS AND WALLS (IF UNINSULATED). PROVIDE 6 SQ. IN / 100SF MIN.
15. FOR FIRE RATED ASSEMBLY LOCATIONS OF WALL PARTITIONS, REFER TO G3-02 & G3-03.
16. PROVIDE MIN. R-19 THERMAL INSULATION AT ALL EXTERIOR WALLS.

DIMENSION PLAN NOTES

1. ALL EXTERIOR DIMENSIONS TO EDGE OF FOUNDATION, FACE OF FRAMING, AND FACE OF STOREFRONT, U.O.N.
2. ALL INTERIOR DIMENSION TO FACE OF FRAMING, U.O.N.

FLOOR PLAN SYMBOLS

- WALL FRAMING, SEE PARTITION SCHEDULE
- EXISTING WALL STRUCTURE TO REMAIN
- FE — SEMI RECESSED FIRE EXTINGUISHER CABINET WITH FIRE EXTINGUISHER.
- EXISTING STRUCTURAL COLUMNS, S.S.D.
- 101 — ROOM NUMBER

KEYNOTE LEGEND

08.01 ALIGN DOOR OPENING WITH NEAREST BRICK GROUT LINE. MAINTAIN MIN. 4" CLEARANCE FOR DOOR JAMB.

SCALE: 1/8" = 1'-0"

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DIMENSION PLAN

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A2-12

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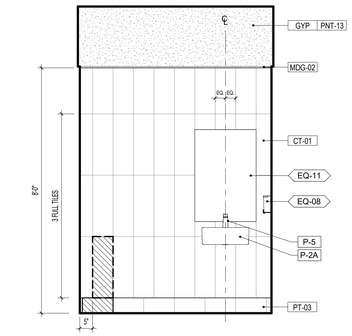
EQUIPMENT SCHEDULE

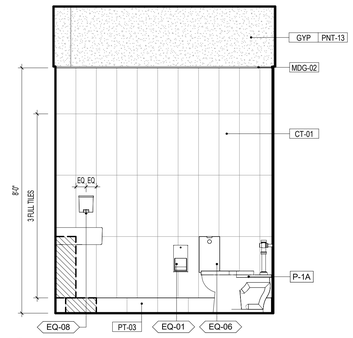
MARK	TYPE	MANUFACTURER	MODEL	DESCRIPTION
EQ-01				
EQ-04				
01 RESTROOM				
EQ-01	TOILET TISSUE DISPENSER	BOBRICK	B-4288	CONTURA SERIES, SURFACE MOUNTED, MULTI-ROLL TOILET TISSUE DISPENSER, SATIN-FINISH STAINLESS STEEL
EQ-02	GRAB BAR	BOBRICK	B-5806.99x42	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-02A	GRAB BAR	BOBRICK	B-5806.99x36	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-03	BABY CHANGING STATION	BOBRICK	KB301-SS	VERTICAL SURFACE MOUNTED STAINLESS STEEL BABY CHANGING STATION
EQ-04	SEAT COVER DISPENSOR	BOBRICK	B-4221	BOBRICK CONTURA SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-05	ROBE HOOK	BOBRICK	B-76717	SURFACE MOUNTED SINGLE ROBE HOOK, SATIN FINISH STAINLESS STEEL
EQ-06	SANITARY NAPKIN DISPOSAL	BOBRICK	B-254	CLASSIC SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-07	PAPER TOWEL DISPENSER & WASTE BIN	BOBRICK	B-3940	CLASSIC SERIES RECESSED CONVERTIBLE PAPER TOWER DISPENSER AND WASTE RECEPTICAL, STAINLESS STEEL
EQ-08	SOAP DISPENSER	BOBRICK	B-2012	AUTOMATIC WALL-MOUNTED SOAP DISPENSOR, STAINLESS STEEL
EQ-09	TOILET PARTITION	SCRANTON	HINY HIDERS	FLOOR MOUNTED OVERHEAD BRACED TOILEY PARTITIONS, HARDWARE & SHOES, CONTINUOUS HINGE, COLOR: FOSSIL, FINISH: ORANE PEEL
EQ-10	URINIAL PARTITION	SCRANTON	HINY HIDERS	WALL MOUNTED URINAL PARTITIONS, FINISH TO MATCH EQ-09
EQ-11	MIRROR	BOBRICK	B-2908	TEMPERED GLASS MIRROR, 24x36
02 WARMING KITCHEN				
EQ-20	WARMING OVEN	AVANTCO	KMC-F-530-LA	FULL HEIGHT, COMBINATION, FULL LENGTH DOOR, AND UNIVERSAL WIRE, 6" MIN LEGS OR CASTERS
EQ-21	WIRE SHELVING	ADVANCED TABCO	EC-1830	FOUR TIER COMBINATION CHROME WIRE SHELVING, 30"W X 18"D, HEAVY DUTY, CHOME PLATED FINISH, , 6" MIN LEGS
EQ-22	TRASH RECEPTACLE	By Owner	NIKEC	Trash Receptacle, 23 Gallon
EQ-23	REACH-IN REFRIGERATOR	True	TS-49-HC	Refrigerator, Reach-In
EQ-24	WORKTABLE	Advance Tabco	HB-SS-248	WORKTABLE W/ ENCLOSED BASE, HINGED DOORS, 6" MIN LEGS,
EQ-25	PASS-THRU SHELF	Fabricated	Stainless Steel	Pass-Thru Shelf
EQ-26	MICROWAVE	AMANA	RCS10TS	STACKABLE COMMERCIAL MICROWAVE W/ PUSH BUTTON CONTROLS, 120V, 1000W
EQ-27	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Double With Concealed Brackets
EQ-28	WORKTABLE	Advance Tabco	KMSLAG-245-X	STAINLESS STEEL WORK TABLE, 60"W X 24" D, 16 GAUGE W/ 5" H BACKSPASH, ADJUSTABLE UNDERSHELF, STAINLESS STEEL LEGS
EQ-29	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Tubular
EQ-30	WALL FLASHING	Fabricated	Stainless Steel	STAINLESS STEEL WALL FLASHING
EQ-31	3-COMPARTMENT SINK	Advance Tabco	93-3-54-18RL	REGALINE SINK, 3-COMPARTMENT, WITH LEFT & RIGHT-HAND DRAINBOARDS, 20" FRONT-TO-BACK X 16"W SINK COMPARTMENTS, 12" DEEP
EQ-32	LOCKERS	By Owner	NIKEC	METAL LOCKERS, TWO TIERS,
EQ-33	HAND SINK	Advance Tabco	7-PS-80	COMBINATION HAND SINK W/ TOWEL AND SOAP DISPENSER - 17 1/4" x 15 1/4", S.P.D.
EQ-34	SINK FAUCET	ADVANCE TABCO	K-105	FAUCET, 8" O.C., SPLASH MOUNTED WITH 14" SWING SPOUT, S.P.D.
EQ-35	PRE-RINSE FAUCET	ADVANCE TABCO	K-116	T&S HEAVY DUTY PRE-RINSE FAUCET, 8" O.C., S.P.D.
03 ASSEMBLY ROOMS				
EQ-50	MOTORIZED WINDOW SHADE	MECHOSHADE	ELECTROSHADE	iQ3-DC WIRELESS MOTOR, FRAME TO TO MATCH STOREFRONT FINISH, FABRIC TO BE SOHO SERIES 1600 3% OPEN BLACK BROWN
04 JANITORIAL				
EQ-36	UTILITY SHELF	BRADLEY	9985	UTILITY SHELF W/ 4 HOOK, 5 HOLDERS, AND 1 DRYING ROD - 42" WIDE

PLUMBING FIXTURES SCHEDULE

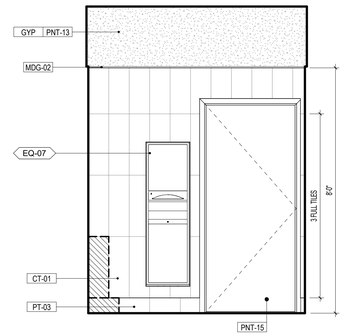
MARK	TYPE	MANUFACTURER	MODEL	DESCRIPTION	COMMENTS
P-1	WALL MOUNTED TOILET	S.P.D.	-	-	S.P.D.
P-1A	FLOOR MOUNTED TOILET	<varies>	<varies>	<varies>	S.P.D.
P-2	UNDERMOUNT SINK	Kohler	K-2214	Ladena® undercounter lavatory, 18 inch x 12 inch	S.P.D.
P-2A	SINGLE LAVATORY	Sloan Valve	SS-3026	Vitreous China Vessel Lavatory.	S.P.D.
P-3	FLOOR DRAIN	S.P.D.	-	-	S.P.D.
P-4	URINAL	S.P.D.	-	-	S.P.D.
P-5	FAUCET	S.P.D.	-	-	S.P.D.
P-6	HIGH-LOW DRINKING FOUNTAIN	ELKAY	-	-	S.P.D.
P-7	MOP SINK	S.P.D.	-	-	S.P.D.
P-8	FLOOR SINK	S.P.D.	-	-	S.P.D.



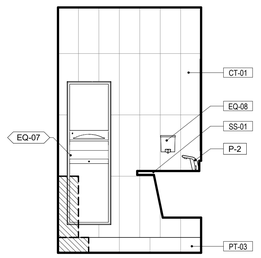
12 RR STAFF - ROOM 104 - NORTH
1/2" = 1'-0"



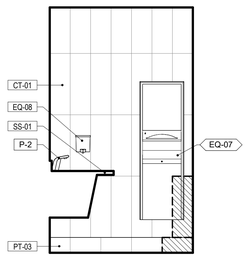
11 RR STAFF - ROOM 104 - EAST
1/2" = 1'-0"



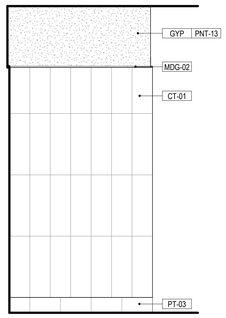
8 RR STAFF - ROOM 104 - WEST
1/2" = 1'-0"



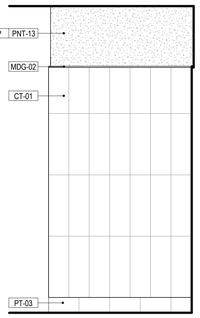
10 RR WOMEN'S - ROOM 115 -A
1/2" = 1'-0"



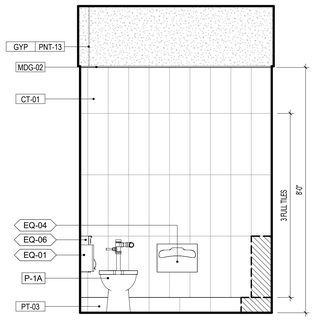
9 RR WOMEN'S - ROOM 115 -B
1/2" = 1'-0"



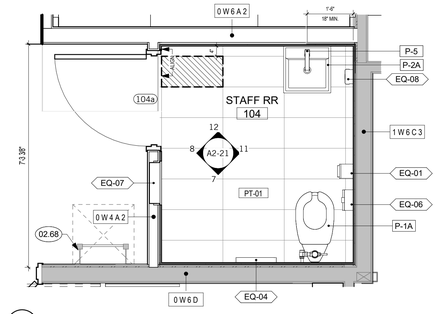
13 RR WOMEN'S - ROOM 115 -C
1/2" = 1'-0"



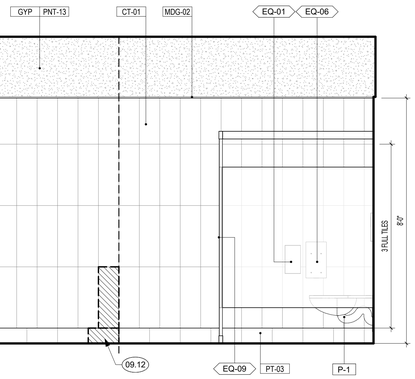
14 RR WOMEN'S - ROOM 115 -D
1/2" = 1'-0"



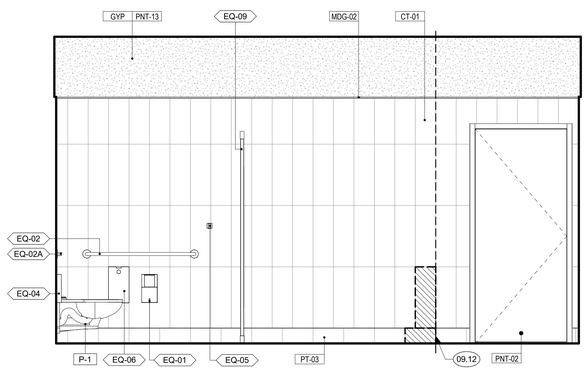
7 RR STAFF - ROOM 104 - SOUTH
1/2" = 1'-0"



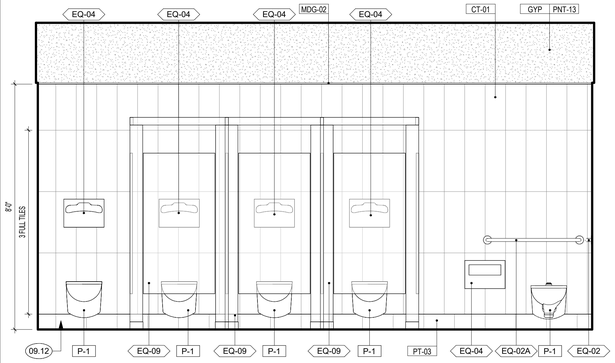
6 ENLARGED PLAN - STAFF RESTROOM
1/2" = 1'-0"



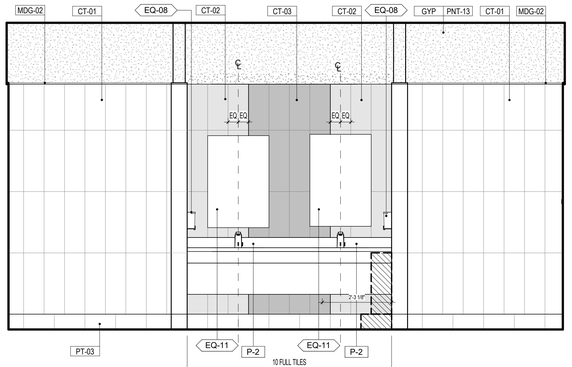
5 RR WOMEN'S - ROOM 115 - SOUTH
1/2" = 1'-0"



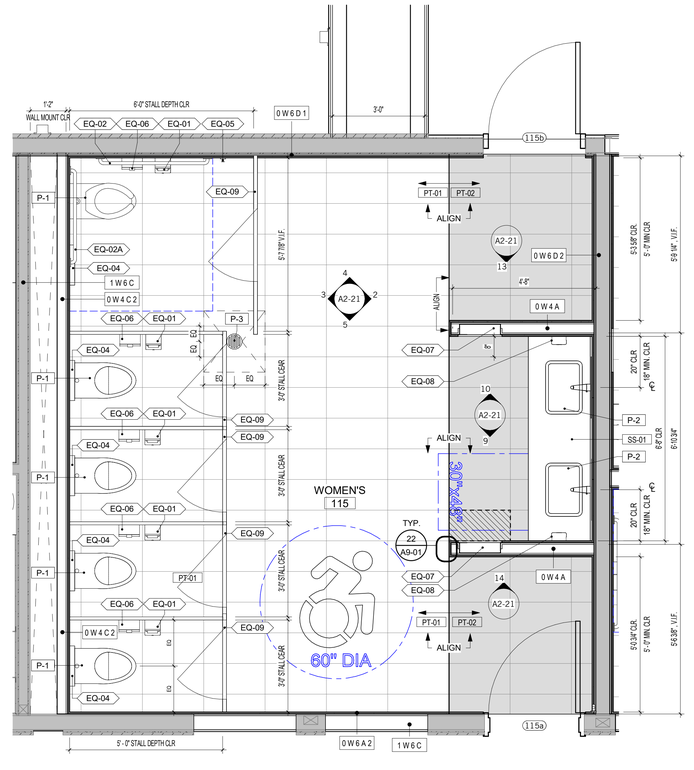
4 RR WOMEN'S - ROOM 115 - NORTH
1/2" = 1'-0"



3 RR WOMEN'S - ROOM 115 - WEST
1/2" = 1'-0"



2 RR WOMEN'S - ROOM 115 - EAST
1/2" = 1'-0"



1 ENLARGED PLAN - WOMEN'S RESTROOMS
1/2" = 1'-0"

ENLARGED PLAN NOTES

1. ALL INTERIOR CLEAR DIMENSIONS TO FACE OF FINISH (U.O.N.)
2. SEE GENERAL ACCESSIBILITY SHEETS FOR EQUIPMENT MOUNTING ON SHEET G1-42
3. FOR FINISH INFORMATION SEE A7-31 FOR FINISH SCHEDULE AND A8 SERIES FOR INTERIOR ELEVATIONS
4. S.E.D. AND S.P.D. FOR ADDITIONAL INFORMATION RELATED TO KITCHEN EQUIPMENT
5. ALL EXTERIOR DIMENSIONS TO FACE OF STUD & FACE OF FOUNDATION (U.O.N.). GRIDLINES ARE TO THE FACE OF STUD AT OUTSIDE EXTERIOR WALLS AND CENTERED BETWEEN UNITS AS DIMENSIONED ON PLANS.
6. ALL INTERIOR DIMENSIONS TO FACE OF STUD (U.O.N.)
7. FOR STUD SIZES AND MATERIAL SEE ALL A2 SERIES PLANS FOR WALL TAGS
8. ALL SHEATHING SURFACE PLANES TO BE CONTINUOUS. ALL GYPSUM BOARD PARTITIONS SHALL BE TAPED AND SANDED SMOOTH WITH NO VISIBLE JOINTS.
9. ALL INTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 4" MINIMUM AND ALL EXTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 6" MINIMUM U.O.N. FOR NOTES AND ADDITIONAL INFORMATION - SEE INDIVIDUAL UNIT FLOOR PLANS.
10. FOR CODE ANALYSIS AND FIRE RATED WALL ASSEMBLIES REFER TO G SERIES SHEETS
11. FOR EXTERIOR FINISH INFORMATION SEE A5 ELEVATIONS
12. FOR REFLECTED CEILING PLAN INFORMATION SEE A3 SERIES SHEETS.
13. SEE A7 SERIES SHEETS FOR DOOR AND WINDOW INFORMATION.
14. ALIGN ALL WALL TILE JOINT LINES WITH FLOOR TILE JOINT LINES.
15. ALL RECESSED ACCESSORIES IN A RATED WALL TO PROTECT THE OPENING TO MAINTAIN THE FIRE BARRIER. REFER TO G3-03 FOR LOCATION OF FIRE RATED WALLS.
16. ALL RECESSED ACCESSORIES IN A RATED WALL TO PROTECT THE OPENING TO MAINTAIN THE FIRE BARRIER. REFER TO G3-03 FOR LOCATION OF FIRE RATED WALLS.
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    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICES,OBBPY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS

ENLARGED PLAN LEGEND

- 5'-0" DIAMETER WHEELCHAIR CLEARANCE
- T-SHAPED TURNING WHEELCHAIR CLEARANCE
- 30" X 48" CLEAR SPACE
- 60" X 56" CLEAR SPACE AT WALL HUNG TOILET
- 1 W 6 A 0 — WALL TYPE - SEE SHEET A3-01
- STARTING TILE

KEYNOTE LEGEND

02.68 PROTECT IN PLACE (E) LADDER TO REMAIN.
09.12 ALIGN WALL TILE JOINT WITH FLOOR TILE JOINT

SCALE: 1/2" = 1'-0"

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JOB NO. 1533.006
DRAWN Author
CHECK Checker

ENLARGED RESTROOM PLANS & ELEVATION

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A2-21

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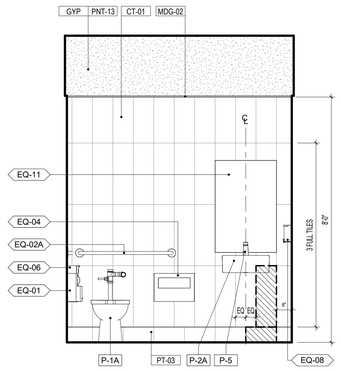
EQUIPMENT SCHEDULE

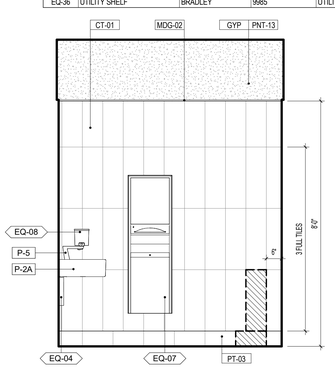
MARK	TYPE	MANUFACTURER	MODEL	DESCRIPTION
EQ-01				
EQ-04				
01 RESTROOM				
EQ-01	TOILET TISSUE DISPENSER	BOBRICK	B-4288	CONTURA SERIES, SURFACE MOUNTED, MULTI-ROLL TOILET TISSUE DISPENSER, SATIN-FINISH STAINLESS STEEL
EQ-02	GRAB BAR	BOBRICK	B-5806.99x42	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-02A	GRAB BAR	BOBRICK	B-5806.99x36	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-03	BABY CHANGING STATION	BOBRICK	KB301-SS	VERTICAL SURFACE MOUNTED STAINLESS STEEL BABY CHANGING STATION
EQ-04	SEAT COVER DISPENSOR	BOBRICK	B-4221	BOBRICK CONTURA SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-05	ROBE HOOK	BOBRICK	B-76717	SURFACE MOUNTED SINGLE ROBE HOOK, SATIN FINISH STAINLESS STEEL
EQ-06	SANITARY NAPKIN DISPOSAL	BOBRICK	B-254	CLASSIC SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-07	PAPER TOWEL DISPENSER & WASTE BIN	BOBRICK	B-3940	CLASSIC SERIES RECESSED CONVERTIBLE PAPER TOWER DISPENSER AND WASTE RECEPTICAL, STAINLESS STEEL
EQ-08	SOAP DISPENSER	BOBRICK	B-2012	AUTOMATIC WALL-MOUNTED SOAP DISPENSOR, STAINLESS STEEL
EQ-09	TOILET PARTITION	SCRANTON	HINY HIDERS	FLOOR MOUNTED OVERHEAD BRACED TOILEY PARTITIONS, HARDWARE & SHOES, CONTINUOUS HINGE, COLOR: FOSSIL, FINISH: ORANE PEEL
EQ-10	URNIAL PARTITION	SCRANTON	HINY HIDERS	WALL MOUNTED URINAL PARTITIONS, FINISH TO MATCH EQ-09
EQ-11	MIRROR	BOBRICK	B-2908	TEMPERED GLASS MIRROR, 24x36
02 WARMING KITCHEN				
EQ-20	WARMING OVEN	AVANTCO	KMC-F-530-LA	FULL HEIGHT, COMBINATION, FULL LENGTH DOOR, AND UNIVERSAL WIRE, 6" MIN LEGS OR CASTERS
EQ-21	WIRE SHELVING	ADVANCED TABCO	EC-1830	FOUR TIER COMBINATION CHROME WIRE SHELVING, 30"W X 18"D, HEAVY DUTY, CHOME PLATED FINISH, , 6" MIN LEGS
EQ-22	TRASH RECEPTACLE	By Owner	NIKEC	Trash Receptacle, 23 Gallon
EQ-23	REACH-IN REFRIGERATOR	True	TS-49-HC	Refrigerator, Reach-In
EQ-24	WORKTABLE	Advance Tabco	HB-SS-248	WORKTABLE W/ ENCLOSED BASE, HINGED DOORS, 6" MIN LEGS,
EQ-25	PASS-THRU SHELF	Fabricated	Stainless Steel	Pass-Thru Shelf
EQ-26	MICROWAVE	AMANA	RCS10TS	STACKABLE COMMERCIAL MICROWAVE W/ PUSH BUTTON CONTROLS, 120V, 1000W
EQ-27	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Double With Concealed Brackets
EQ-28	WORKTABLE	Advance Tabco	KMSLAG-245-X	STAINLESS STEEL WORK TABLE, 60"W X 24" D, 16 GAUGE W/ 5" H BACKSPASH, ADJUSTABLE UNDERSHELF, STAINLESS STEEL LEGS
EQ-29	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Tubular
EQ-30	WALL FLASHING	Fabricated	Stainless Steel	STAINLESS STEEL WALL FLASHING
EQ-31	3-COMPARTMENT SINK	Advance Tabco	93-3-54-18RL	REGALINE SINK, 3-COMPARTMENT, WITH LEFT & RIGHT-HAND DRAINBOARDS, 20" FRONT-TO-BACK X 16"W SINK COMPARTMENTS, 12" DEEP
EQ-32	LOCKERS	By Owner	NIKEC	METAL LOCKERS, TWO TIERS.
EQ-33	HAND SINK	Advance Tabco	7-PS-80	COMBINATION HAND SINK W/ TOWEL AND SOAP DISPENSER - 17 1/4" x 15 1/4", S.P.D.
EQ-34	SINK FAUCET	ADVANCE TABCO	K-105	FAUCET, 8" O.C., SPLASH MOUNTED WITH 14" SWING SPOUT, S.P.D.
EQ-35	PRE-RINSE FAUCET	ADVANCE TABCO	K-116	T&S HEAVY DUTY PRE-RINSE FAUCET, 8" O.C., S.P.D.
03 ASSEMBLY ROOMS				
EQ-50	MOTORIZED WINDOW SHADE	MECHOSHADE	ELECTROSHADE	IQ3-DC WIRELESS MOTOR, FRAME TO TO MATCH STOREFRONT FINISH, FABRIC TO BE SOHO SERIES 1600 3% OPEN BLACK BROWN
04 JANITORIAL				
EQ-36	UTILITY SHELF	BRADLEY	9985	UTILITY SHELF W/ 4 HOOK, 5 HOLDERS, AND 1 DRYING ROD - 42" WIDE

PLUMBING FIXTURES SCHEDULE

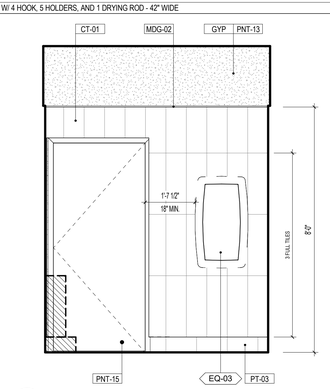
MARK	TYPE	MANUFACTURER	MODEL	DESCRIPTION	COMMENTS
P-1	WALL MOUNTED TOILET	S.P.D.	-	-	S.P.D.
P-1A	FLOOR MOUNTED TOILET	<varies>	<varies>	<varies>	S.P.D.
P-2	UNDERMOUNT SINK	Kohler	K-2214	Ladena® undercounter lavatory, 18 inch x 12 inch	S.P.D.
P-2A	SINGLE LAVATORY	Sloan Valve	SS-3026	Vitreous China Vessel Lavatory.	S.P.D.
P-3	FLOOR DRAIN	S.P.D.	-	-	S.P.D.
P-4	URINAL	S.P.D.	-	-	S.P.D.
P-5	FAUCET	S.P.D.	-	-	S.P.D.
P-6	HIGH,LOW DRINKING FOUNTAIN	ELKAY	-	-	S.P.D.
P-7	MOP SINK	S.P.D.	-	-	S.P.D.
P-8	FLOOR SINK	S.P.D.	-	-	S.P.D.



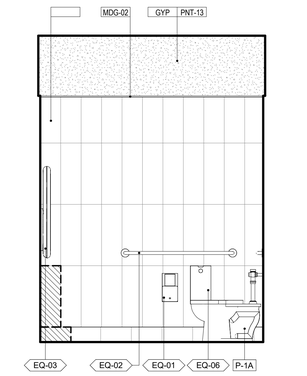
9 FAMILY RESTROOM - ROOM 117 - NORTH
1/2" = 1'-0"



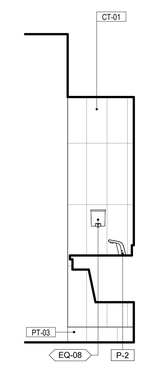
8 FAMILY RESTROOM - ROOM 117 - EAST
1/2" = 1'-0"



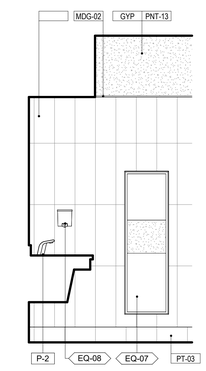
7 FAMILY RESTROOM - ROOM 117 - SOUTH
1/2" = 1'-0"



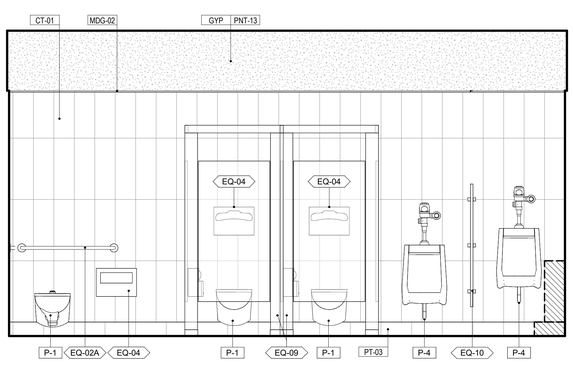
6 FAMILY RESTROOMA - ROOM 117 - WEST
1/2" = 1'-0"



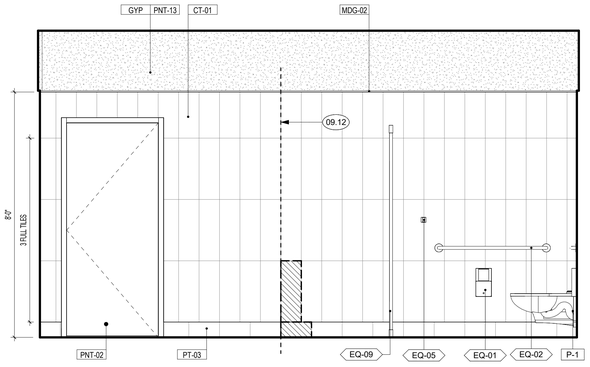
10 RR MEN'S - ROOM 116 - A
1/2" = 1'-0"



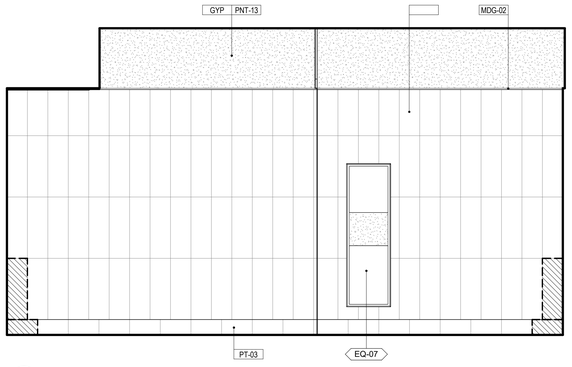
11 RR MEN'S - ROOM 116 - B
1/2" = 1'-0"



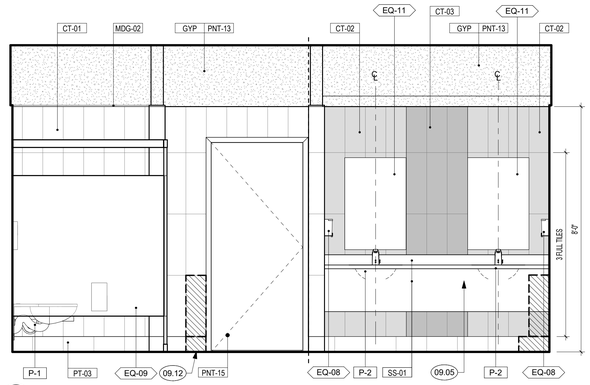
5 RR MEN'S - ROOM 116 - EAST
1/2" = 1'-0"



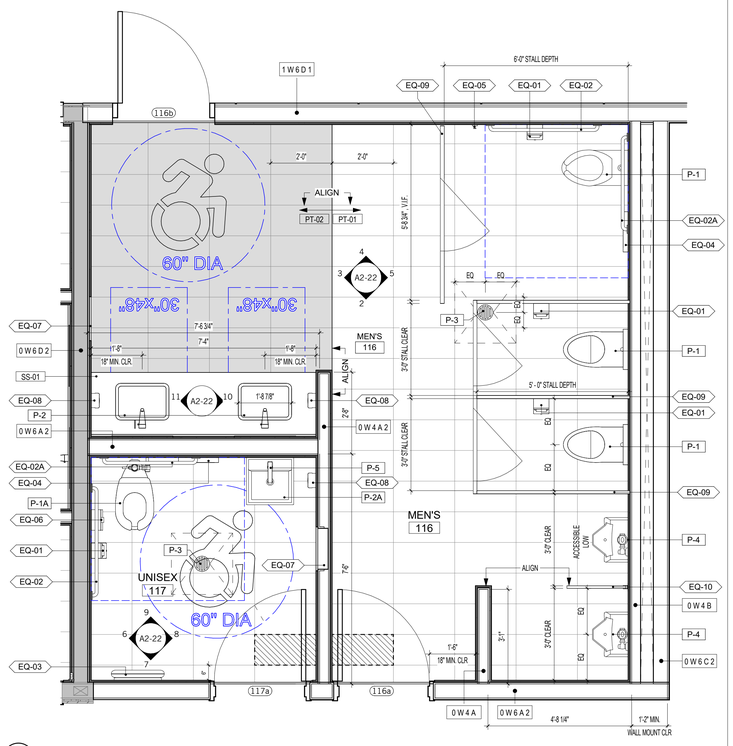
4 RR MEN'S - ROOM 116 - NORTH
1/2" = 1'-0"



3 RR MEN'S- ROOM 116 - WEST
1/2" = 1'-0"



2 RR MEN'S - ROOM 116 - SOUTH
1/2" = 1'-0"



1 ENLARGED PLAN - MENS & ADA - RESTROOMS
1/2" = 1'-0"

ENLARGED PLAN NOTES

1. ALL INTERIOR CLEAR DIMENSIONS TO FACE OF FINISH (U.O.N.)
2. SEE GENERAL ACCESSIBILITY SHEETS FOR EQUIPMENT MOUNTING ON SHEET G1-42
3. FOR FINISH INFORMATION SEE A7-31 FOR FINISH SCHEDULE AND A8 SERIES FOR INTERIOR ELEVATIONS
4. S.E.D. AND S.P.D. FOR ADDITIONAL INFORMATION RELATED TO KITCHEN EQUIPMENT
5. ALL EXTERIOR DIMENSIONS TO FACE OF STUD & FACE OF FOUNDATION (U.O.N.). GRIDLINES ARE TO THE FACE OF STUD AT OUTSIDE EXTERIOR WALLS AND CENTERED BETWEEN UNITS AS DIMENSIONED ON PLANS.
6. ALL INTERIOR DIMENSIONS TO FACE OF STUD (U.O.N.)
7. FOR STUD SIZES AND MATERIAL SEE ALL A2 SERIES PLANS FOR WALL TAGS
8. ALL SHEATHING SURFACE PLANES TO BE CONTINUOUS. ALL GYPSUM BOARD PARTITIONS SHALL BE TAPED AND SANDED SMOOTH WITH NO VISIBLE JOINTS.
9. ALL INTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 4" MINIMUM AND ALL EXTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 6" MINIMUM U.O.N. FOR NOTES AND ADDITIONAL INFORMATION - SEE INDIVIDUAL UNIT FLOOR PLANS.
10. FOR CODE ANALYSIS AND FIRE RATED WALL ASSEMBLIES REFER TO G SERIES SHEETS
11. FOR EXTERIOR FINISH INFORMATION SEE A5 ELEVATIONS
12. FOR REFLECTED CEILING PLAN INFORMATION SEE A3 SERIES SHEETS.
13. SEE A7 SERIES SHEETS FOR DOOR AND WINDOW INFORMATION.
14. ALIGN ALL WALL TILE JOINT LINES WITH FLOOR TILE JOINT LINES.
15. ALL RECESSED ACCESSORIES IN A RATED WALL TO PROTECT THE OPENING TO MAINTAIN THE FIRE BARRIER. REFER TO G3-03 FOR LOCATION OF FIRE RATED WALLS.
16. ALL RECESSED ACCESSORIES IN A RATED WALL TO PROTECT THE OPENING TO MAINTAIN THE FIRE BARRIER. REFER TO G3-03 FOR LOCATION OF FIRE RATED WALLS.
17. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICES,OBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS

ENLARGED PLAN LEGEND

- 5'-0" DIAMETER WHEELCHAIR CLEARANCE
- T-SHAPED TURNING WHEELCHAIR CLEARANCE
- 30" X 48" CLEAR SPACE
- 60" X 56" CLEAR SPACE AT WALL HUNG TOILET
- 1 W 6 A 0 — WALL TYPE - SEE SHEET A3-01
- STARTING TILE

KEYNOTE LEGEND

09.05 SOLID SURFACE FACE PANEL AND SIDE PANELS BELOW BANITY. MOUNT FACE PANEL TO FRAMING WITH Z-CLIP TO FACILITATE REMOVAL FOR SERVICE. FINISH TO MATCH COUNTER.
09.12 ALIGN WALL TILE JOINT WITH FLOOR TILE JOINT

SCALE: 1/2" = 1'-0" (1 2 4)

PROJECT NORTH

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	Author
CHECK	Checker

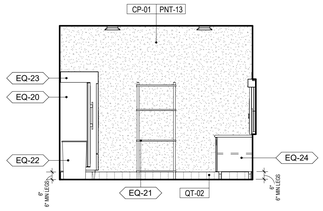
ENLARGED RESTROOM PLANS & ELEVATION

SHEET
A2-22

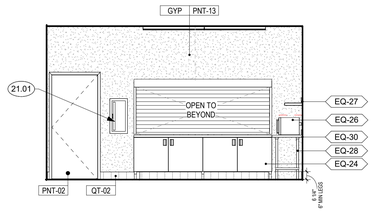
6/26/2025 4:40:36 PM

EQUIPMENT SCHEDULE

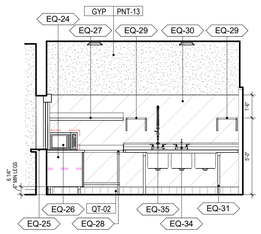
MARK	TYPE	MANUFACTURER	MODEL	DESCRIPTION
EQ-01				
EQ-04				
01 RESTROOM				
EQ-01	TOILET TISSUE DISPENSER	BOBRICK	B-4288	CONTURA SERIES, SURFACE MOUNTED, MULTI-ROLL TOILET TISSUE DISPENSER, SATIN-FINISH STAINLESS STEEL
EQ-02	GRAB BAR	BOBRICK	B-5806.99x42	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-02A	GRAB BAR	BOBRICK	B-5806.99x36	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-03	BABY CHANGING STATION	BOBRICK	KB301-SS	VERTICAL SURFACE MOUNTED STAINLESS STEEL BABY CHANGING STATION
EQ-04	SEAT COVER DISPENSOR	BOBRICK	B-4221	BOBRICK CONTURA SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-05	ROBE HOOK	BOBRICK	B-76717	SURFACE MOUNTED SINGLE ROBE HOOK, SATIN FINISH STAINLESS STEEL
EQ-06	SANITARY NAPKIN DISPOSAL	BOBRICK	B-254	CLASSIC SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-07	PAPER TOWEL DISPENSER & WASTE BIN	BOBRICK	B-3940	CLASSIC SERIES RECESSED CONVERTIBLE PAPER TOWER DISPENSER AND WASTE RECEPTICAL, STAINLESS STEEL
EQ-08	SOAP DISPENSER	BOBRICK	B-2012	AUTOMATIC WALL-MOUNTED SOAP DISPENSOR, STAINLESS STEEL
EQ-09	TOILET PARTITION	SCRANTON	HINY HIDERS	FLOOR MOUNTED OVERHEAD BRACED TOILEY PARTITIONS, HARDWARE & SHOES, CONTINUOUS HINGE, COLOR: FOSSIL, FINISH: ORANE PEEL
EQ-10	URNIAL PARTITION	SCRANTON	HINY HIDERS	WALL MOUNTED URINAL PARTITIONS, FINISH TO MATCH EQ-09
EQ-11	MIRROR	BOBRICK	B-2908	TEMPERED GLASS MIRROR, 24x36
02 WARMING KITCHEN				
EQ-20	WARMING OVEN	AVANTCO	KMC-F-530-LA	FULL HEIGHT, COMBINATION, FULL LENGTH DOOR, AND UNIVERSAL WIRE, 6" MIN LEGS OR CASTERS
EQ-21	WIRE SHELVING	ADVANCED TABCO	EC-1830	FOUR TIER COMBINATION CHROME WIRE SHELVING, 30"W X 18"D, HEAVY DUTY, CHOME PLATED FINISH, , 6" MIN LEGS
EQ-22	TRASH RECEPTACLE	By Owner	NIKEC	Trash Receptacle, 23 Gallon
EQ-23	REACH-IN REFRIGERATOR	True	TS-49-HC	Refrigerator, Reach-In
EQ-24	WORKTABLE	Advance Tabco	HB-SS-248	WORKTABLE W/ ENCLOSED BASE, HINGED DOORS, 6" MIN LEGS,
EQ-25	PASS-THRU SHELF	Fabricated	Stainless Steel	Pass-Thru Shelf
EQ-26	MICROWAVE	AMANA	RCS10TS	STACKABLE COMMERCIAL MICROWAVE W/ PUSH BUTTON CONTROLS, 120V, 1000W
EQ-27	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Double With Concealed Brackets
EQ-28	WORKTABLE	Advance Tabco	KMSLAG-245-X	STAINLESS STEEL WORK TABLE, 60"W X 24" D, 16 GAUGE W/ 5" H BACKSPASH, ADJUSTABLE UNDERSHELF, STAINLESS STEEL LEGS
EQ-29	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Tubular
EQ-30	WALL FLASHING	Fabricated	Stainless Steel	STAINLESS STEEL WALL FLASHING
EQ-31	3-COMPARTMENT SINK	Advance Tabco	93-3-54-18RL	REGALINE SINK, 3-COMPARTMENT, WITH LEFT & RIGHT-HAND DRAINBOARDS, 20" FRONT-TO-BACK X 16"W SINK COMPARTMENTS, 12" DEEP
EQ-32	LOCKERS	By Owner	NIKEC	METAL LOCKERS, TWO TIERS.
EQ-33	HAND SINK	Advance Tabco	7-PS-80	COMBINATION HAND SINK W/ TOWEL AND SOAP DISPENSER - 17 1/4" x 15 1/4", S.P.D.
EQ-34	SINK FAUCET	ADVANCE TABCO	K-105	FAUCET, 8" O.C., SPLASH MOUNTED WITH 14" SWING SPOUT, S.P.D.
EQ-35	PRE-RINSE FAUCET	ADVANCE TABCO	K-116	T&S HEAVY DUTY PRE-RINSE FAUCET, 8" O.C., S.P.D.
03 ASSEMBLY ROOMS				
EQ-50	MOTORIZED WINDOW SHADE	MECHOSHADE	ELECTROSHADE	iQ3-DC WIRELESS MOTOR, FRAME TO TO MATCH STOREFRONT FINISH, FABRIC TO BE SOHO SERIES 1600 3% OPEN BLACK BROWN
04 JANITORIAL				
EQ-36	UTILITY SHELF	BRADLEY	9985	UTILITY SHELF W/ 4 HOOK, 5 HOLDERS, AND 1 DRYING ROD - 42" WIDE



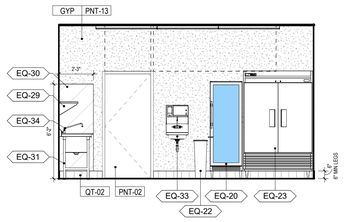
5 BANQUET- ROOM 129- SOUTH
1/4" = 1'-0"



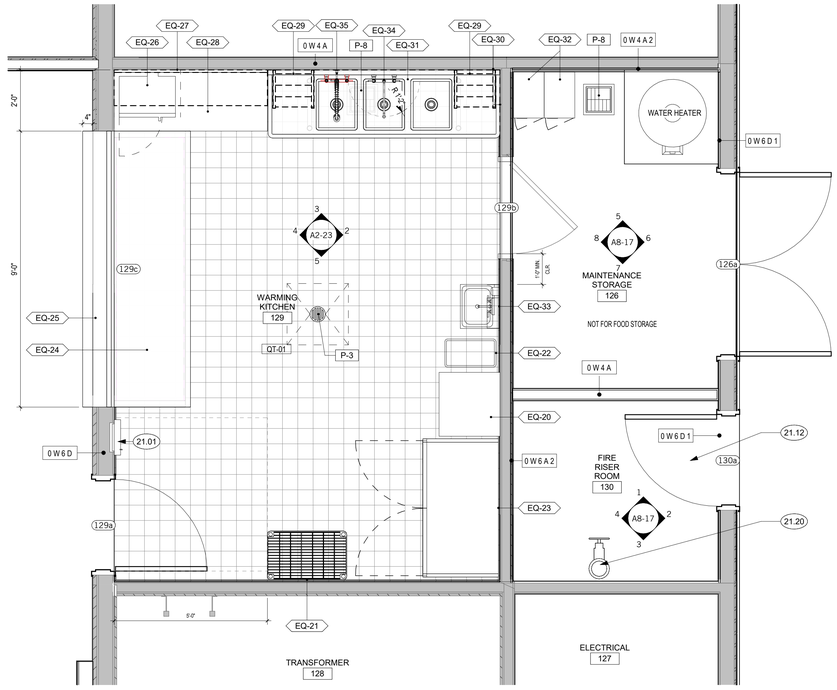
4 BANQUET- ROOM 129 - WEST
1/4" = 1'-0"



3 BANQUET- ROOM 129- NORTH
1/4" = 1'-0"



2 BANQUET- ROOM 129 - EAST
1/4" = 1'-0"



1 ENLARGED PLAN - WARMING KITCHEN
1/2" = 1'-0"

ENLARGED PLAN NOTES

1. ALL INTERIOR CLEAR DIMENSIONS TO FACE OF FINISH (U.O.N.)
2. SEE GENERAL ACCESSIBILITY SHEETS FOR EQUIPMENT MOUNTING ON SHEET G1-42
3. FOR FINISH INFORMATION SEE A7-31 FOR FINISH SCHEDULE AND A8 SERIES FOR INTERIOR ELEVATIONS
4. S.E.D. AND S.P.D. FOR ADDITIONAL INFORMATION RELATED TO KITCHEN EQUIPMENT
5. ALL EXTERIOR DIMENSIONS TO FACE OF STUD & FACE OF FOUNDATION (U.O.N.). GRIDLINES ARE TO THE FACE OF STUD AT OUTSIDE EXTERIOR WALLS AND CENTERED BETWEEN UNITS AS DIMENSIONED ON PLANS.
6. ALL INTERIOR DIMENSIONS TO FACE OF STUD (U.O.N.)
7. FOR STUD SIZES AND MATERIAL SEE ALL A2 SERIES PLANS FOR WALL TAGS
8. ALL SHEATHING SURFACE PLANES TO BE CONTINUOUS. ALL GYPSUM BOARD PARTITIONS SHALL BE TAPED AND SANDED SMOOTH WITH NO VISIBLE JOINTS.
9. ALL INTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 4" MINIMUM AND ALL EXTERIOR DOOR JAMBS ON HINGE SIDE SHALL BE 6" MINIMUM U.O.N. FOR NOTES AND ADDITIONAL INFORMATION - SEE INDIVIDUAL UNIT FLOOR PLANS.
10. FOR CODE ANALYSIS AND FIRE RATED WALL ASSEMBLIES REFER TO G SERIES SHEETS
11. FOR EXTERIOR FINISH INFORMATION SEE A5 ELEVATIONS
12. FOR REFLECTED CEILING PLAN INFORMATION SEE A3 SERIES SHEETS.
13. SEE A7 SERIES SHEETS FOR DOOR AND WINDOW INFORMATION.
14. ALIGN ALL WALL TILE JOINT LINES WITH FLOOR TILE JOINT LINES.
15. ALL RECESSED ACCESSORIES IN A RATED WALL TO PROTECT THE OPENING TO MAINTAIN THE FIRE BARRIER. REFER TO G3-03 FOR LOCATION OF FIRE RATED WALLS.
16. ALL RECESSED ACCESSORIES IN A RATED WALL TO PROTECT THE OPENING TO MAINTAIN THE FIRE BARRIER. REFER TO G3-03 FOR LOCATION OF FIRE RATED WALLS.
17. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS

ENLARGED PLAN LEGEND

- 5'-0" DIAMETER WHEELCHAIR CLEARANCE
- T-SHAPED TURNING WHEELCHAIR CLEARANCE
- 30" X 48" CLEAR SPACE
- 60" X 56" CLEAR SPACE AT WALL HUNG TOILET
- 1 W 6 A 0 — WALL TYPE - SEE SHEET A3-01
- STARTING TILE

KEYNOTE LEGEND

21.01 SEMI-RECESSED FIRE EXTINGUISHER CABINET
21.12 INSTALL UNDERGROUND WATER SERVICE LINE TO MAIN FOR FIRE PROTECTION SYSTEM, FINAL ROUTING TO BE COORDINATED, S.C.D.
21.20 FIRE RISER, SPD

SCALE: 1/2" = 1'-0"

PROJECT NORTH

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

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JOB NO.	**1533.006**
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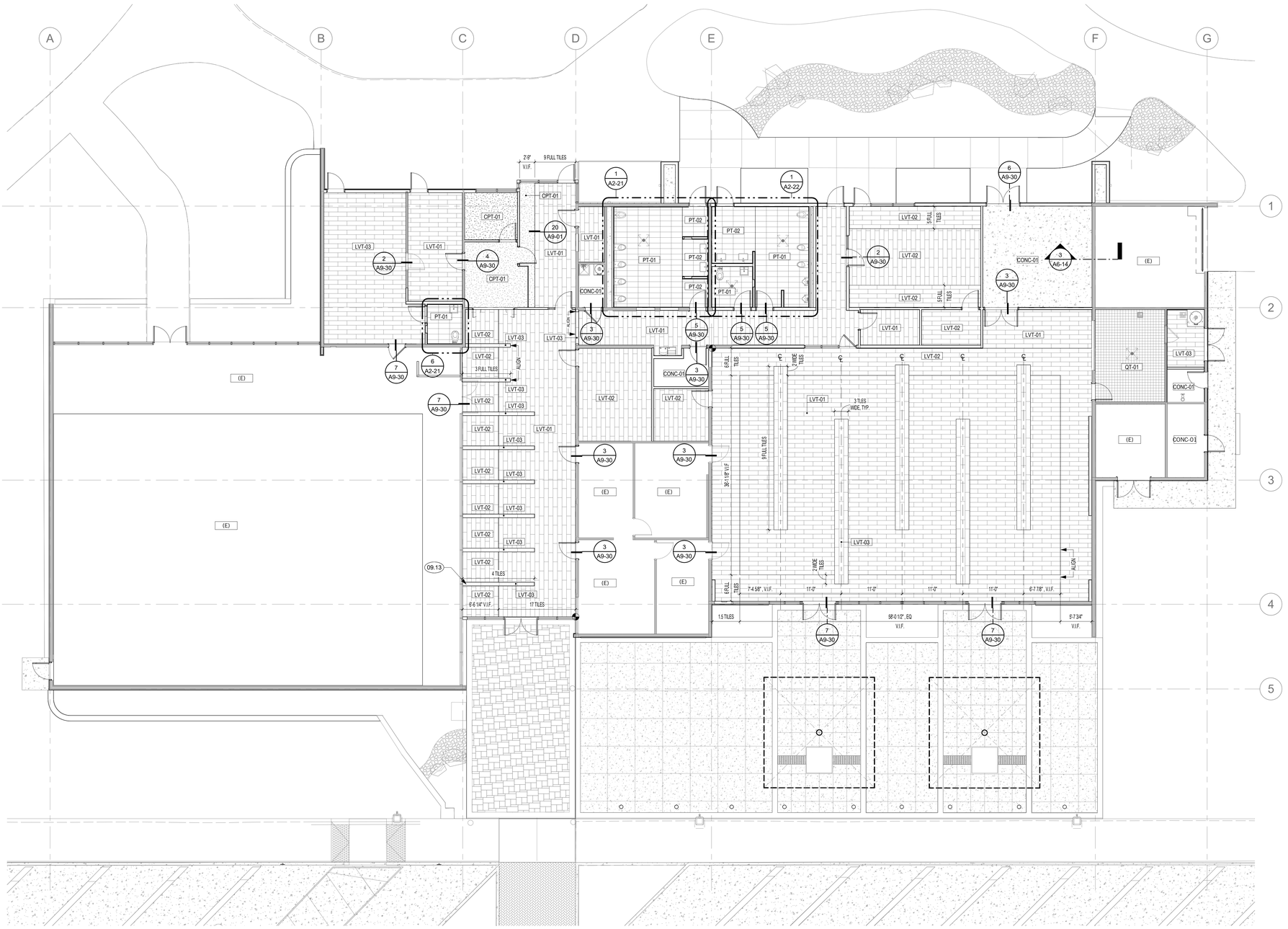
ENLARGED WARMING KITCHEN PLANS & ELEVATIONS

SHEET
A2-23

6/26/2025 4:40:41 PM



1 FINISH PLAN - 1ST FLOOR
1/8" = 1'-0"

FINISH PLAN NOTES

1. SEE FINISH SCHEDULE AND PROJECT MANUAL FOR ALL MATERIAL INFORMATION
2. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N.
3. ALL CEILING TO BE PNT-13, U.O.N.
4. PAINT LAYERING: (1) PRIMER; (2) PAINT COLOR
5. PROVIDE PAINT BRUSH OUTS TO ARCHITECT FOR REVIEW PRIOR TO START OF WORK. SEE PROJECT MANUAL.
6. PROVIDE FINISH SAMPLES OF ALL TILE & GROUT TO ARCHITECT FOR REVIEW PRIOR TO PURCHASE AND INSTALLATION - SEE PROJECT MANUAL
7. ALL ELECTRICAL COVER PLATES ON ACCENT WALLS SHALL BE PAINTED TO MATCH ACCENT WALL
8. THROUGHOUT KITCHEN, SLOPE TILE FOR POSITIVE DRAINAGE TO FLOOR DRAINS, MIN. 1/16" PER FOOT
9. ALL RECESSED WALL CABINETS SHALL BE PAINTED TO MATCH ACCENT WALL. FINISH: SEMI-GLOSS
10. FOR WALL FINISH INFORMATION NOT SHOWN, SEE INTERIOR ELEVATIONS
11. FOR CEILING FINISH INFORMATION SEE REFLECTED CEILING PLAN SHEET
12. FOR CERAMIC TILE WORK POINT LOCATIONS, REFER TO A2 ENARGED FLOOR PLANS
13. FOR EXTERIOR FINISHES SEE A1-11 AND SCD AND SLD
14. CURTAIN, DRAPERIES, FABRIC HANGINGS AND SIMILAR COMBUSTIBLE DECORATIVE MATERIALS SUSPENDED FROM WALLS OR CEILINGS SHALL COMPLY WITH FIRE CODE SECTION 807 AND MEET THE FLAME PROPAGATION PERFORMANCE CRITERIA OF NFPA 701.

FINISH PLAN SYMBOLS

MTL-01 INTERIOR FINISH MATERIAL, SEE A7-31

WORK POINT

FINISH LEGEND

FLOOR				
CONC-01	SEALED CONCRETE	ULTRASIL LI+	CLEAR	
CPT-01	CARPET	BIKE PATH	104657 OREGANO / LIME	
LVT-01	LUXURY VINYL TILE	STUDIO SET	SAND	
LVT-02	LUXURY VINYL TILE	STUDIO SET	PEWTER	
LVT-03	LUXURY VINYL TILE	STUDIO SET	PEBBLE	
PT-01	PORCELAIN TILE	PORTFOLIO	ASH GREY	
PT-02	PORCELAIN TILE	PORTFOLIO	DOVE GREY	
QT-01	QUARRY TILE	QUARRY TILE	ARID GRAY 9Q42	

KEYNOTE LEGEND

09.13 ALIGN TILE ACCENT WITH MULLIONS

SCALE: 3/8" = 1'-0"

PROJECT NORTH

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

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FLOOR FINISH PLAN

SHEET
A2-31

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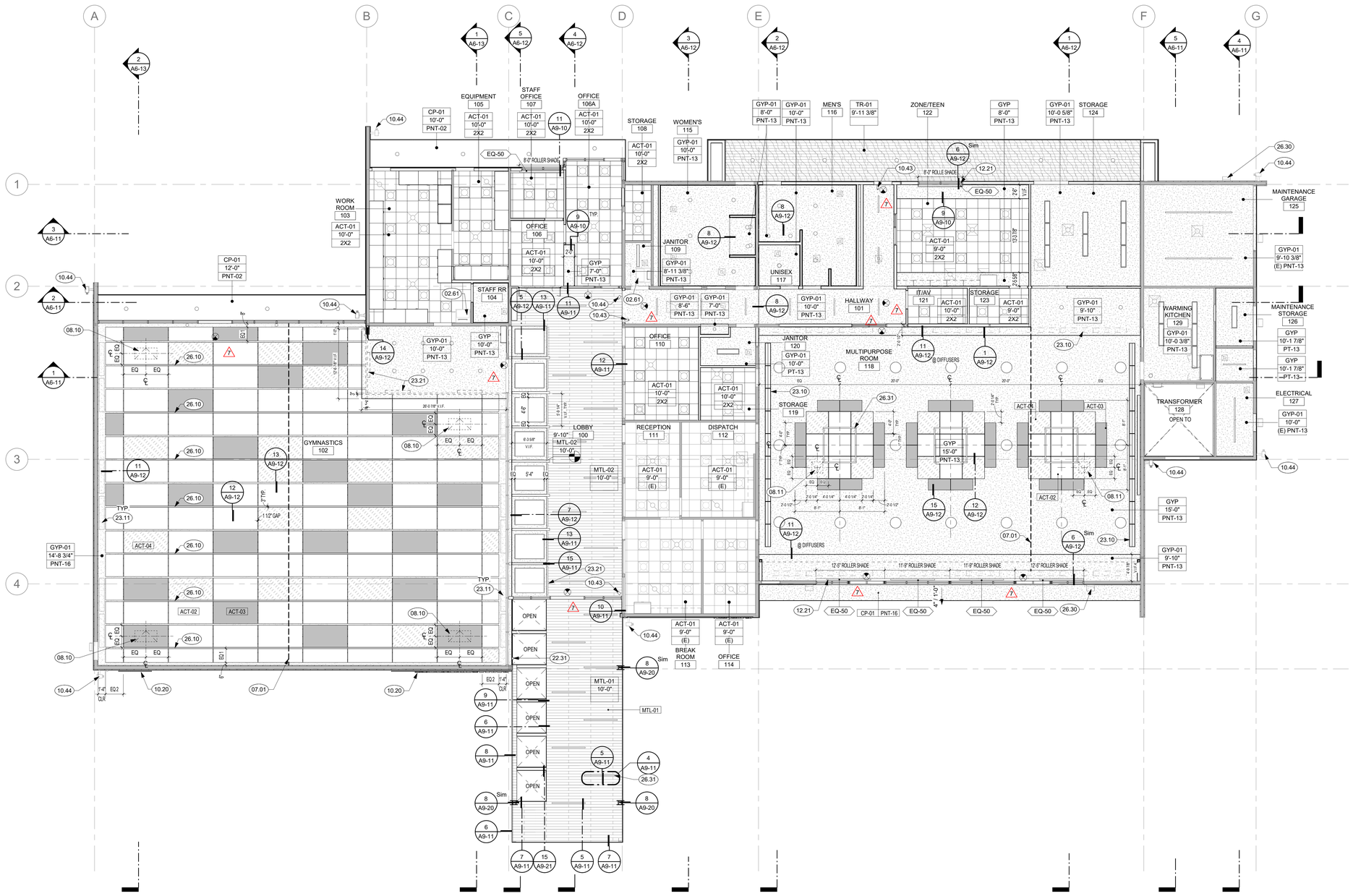

1 REFLECTED CEILING PLAN
1/8" = 1'-0"

REFLECTED CEILING NOTES

1. TYPICAL CEILING 5/8" TYPE 'X' GYP BD (U.O.N.)
2. ALL CEILING HEIGHTS TO BTM. OF FINISH FROM T.O.C. (U.O.N.)
3. ALL EXTERIOR SOFFIT HEIGHTS SHALL BE TO BTM. OF FINISH, FROM T.O.C. (U.O.N.).
4. ALL EXTERIOR SOFFITS SHALL BE CP-1, U.O.N.
5. ACOUSTICAL CLG. TILE HTS. TO BTM. OF FIN. CEILING FROM T.O.C. (U.O.N.)
6. ALL DIMENSIONS TO F.O. FRAMING, (U.O.N.)
7. FOR ACOUSTICAL TILE TYPES, SEE FINISH SCHEDULE
8. LOCATE ACOUSTICAL GRIDS / CEILING TILES IN CENTER-LINE OF ROOMS, HALLWAYS U.O.N.
9. FOR CEILING DIFFUSERS, REGISTERS, AND VENTS TYPES, S.M.D.. LOCATIONS ARE GOVERNED BY THIS DRAWING / DOCUMENTS.
10. FOR FURTHER INFORMATION REGARDING CEILING FIXTURES TYPES, S.E.D.. LOCATIONS ARE GOVERNED BY THIS DRAWING/ DOCUMENTS.
11. COORDINATE ALL FRAMING AT RECESSED FIXTURE LOCATIONS TO ACCOMMODATE FIXTURE. LAYOUT FIXTURE PRIOR TO FRAMING.
12. SEE A6 WALL SECTIONS FOR HEIGHTS NOT SHOWN
13. ALL CEILING SPEAKERS SHALL BE CENTERED WITHIN TILES OF ALIGNED WITH OTHER FIXTURES AS SHOWN. ALL SPEAKERS LOCATED AT EXTERIOR OR WITHIN WOOD CEILING SHALL BE PAINTED BLACK, TYP., U.O.N.
14. FOR DIMENSIONAL LAYOUT NOT SHOWN, SEE SHEET A3-12.
15. SEE A7-13 FOR MORE INFORMATION ON CEILING FINISH.
16. FOR FURTHER INFORMATION REGARDING FIRE SPRINKLERS AND LOCATIONS, SEE DESIGN-BUILD SPRINKLER DRAWINGS. ALL SPRINKLER HEADS SHALL BE LOCATED AT THE CENTER OF CEILING TILES AND SOFFITS, TYP. U.O.N. INSTALLER SHALL COORDINATE INSTALLATION WITH ALL OTHER TRADES TO AVOID CONFLICTS WITH HEAD LOCATIONS AND PIPE RUNS.

REFLECTED CEILING SYMBOLS

MTL-01 INTERIOR FINISH MATERIAL, SEE A7-31

ALIGN

MECH. REGISTERS (S.M.D.)

LIGHT FIXTURES (S.E.D.)

KEYNOTE LEGEND

02.61 PROTECT IN PLACE (E) ROOF HATCH AND LADDER TO REMAIN
07.01 FIRE DRAFT STOPPING, ATTIC AREA TO BE LESS THAT 3,000 SF, INSTALL 1 LAYER OF 5/8 GYP BD TO FACE OF TRUSS SPANNING TO ROOF FRAMING ABOVE PER CBC SECTION 718
08.10 CEILING MOUNTED ACCESS PANEL, 2'X4', WHITE, MODIFY METAL FURRING AND ATTACHMENTS AS NECESSARY, REFER TO 9/A9-12
08.11 CEILING MOUNTED ACCESS PANEL, 2'X4', WHITE, MODIFY METAL FURRING AND ATTACHMENTS AS NECESSARY, REFER TO 9/A9-12
10.20 WALL MOUNTED ALUMINUM BUILDING SIGN, PIN MOUNTED OFF (E) BRICK WALL FINISH, REFER TO 5/A9-25 AND GRAPHICS PACKAGE
10.43 CEILING MOUNTED SECURITY CAMERA, S.E.D. FOR CONDUIT ROUTING AND SPECIFICATION, VERIFY FINAL LOCATION AND DIRECTION WITH THE CITY.
10.44 WALL MOUNTED SECURITY CAMERA, S.E.D. FOR CONDUIT ROUTING AND SPECIFICATION, VERIFY FINAL LOCATION AND DIRECTION WITH THE CITY.
12.21 SURFACE MOUNTED MOTORIZED ROLLER SHADES IN PRE-MANUFACTURED ROLLER SHADE POCKET.
22.31 OVERFLOW NOZZLE, S.P.D.
23.10 CEILING MOUNTED DIFFUSERS BEYOND AT HIGH CEILING, FINISH TO MATCH ADJACENT SURFACES, S.M.D.
23.11 CEILING MOUNTED DIFFUSERS, FINISH TO MATCH ADJACENT SURFACES, S.M.D.
23.21 WALL MOUNTED DIFFUSERS, FINISH TO MATCH ADJACENT SURFACES, S.M.D.
26.10 LINEAR LIGHT FIXTURE, S.E.D.
26.30 EXTERIOR WALL MOUNTED LIGHTING FIXTURE, S.E.D.
26.31 SUSPENDED LIGHT FIXTURES, S.E.D.

SCALE: 1/8" = 1'-0"

PROJECT NORTH

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CITY OF LAKEWOOD CALIFORNIA

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REFLECTED CEILING PLAN

SHEET
A3-11

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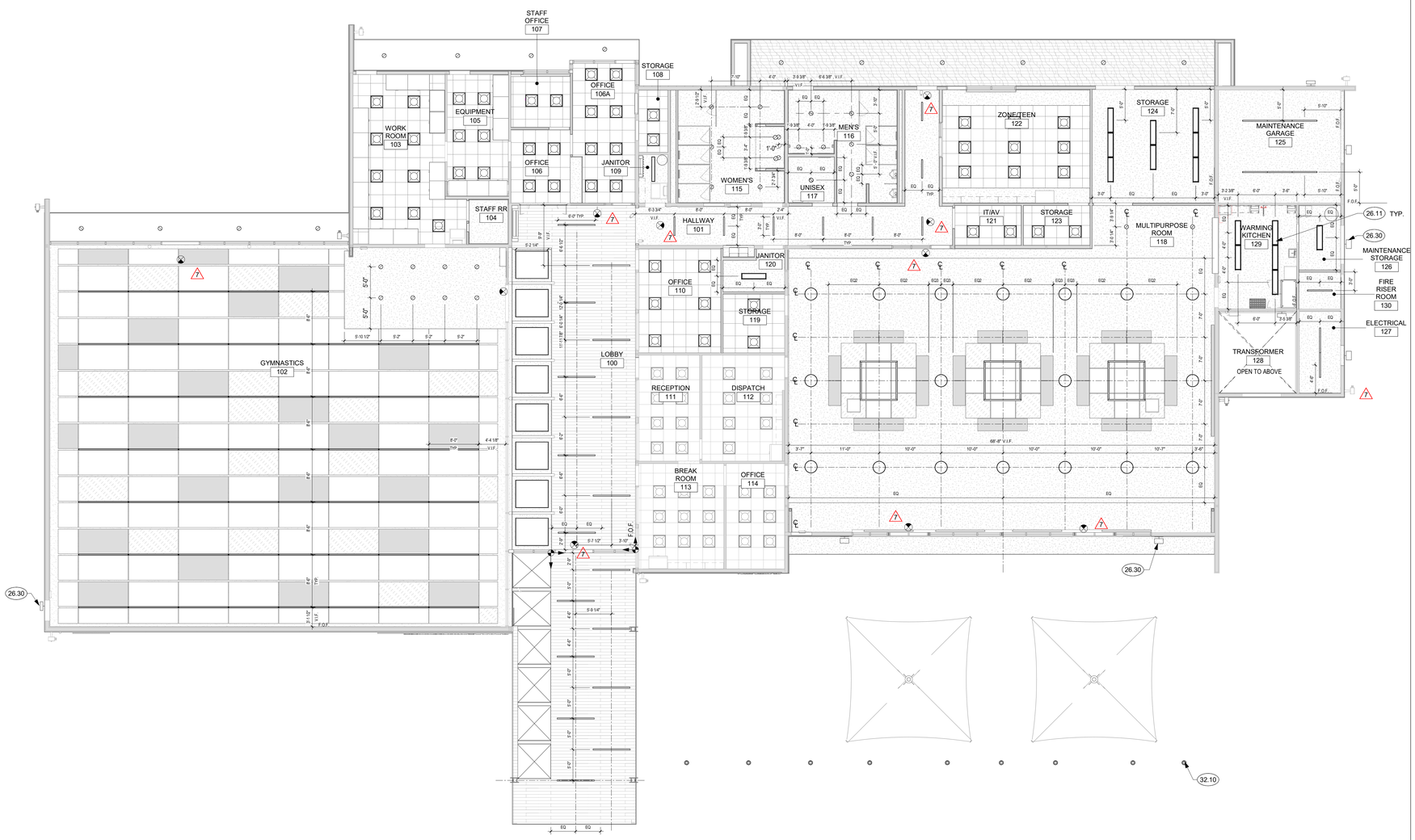

1 REFLECTED CEILING DIMENSION PLAN

1/8" = 1'-0"

LIGHTING NOTES

1. REFER TO ELECTRICAL SCHEDULE FOR TYPICAL FIXTURES, SED

REFLECTED CEILING SYMBOLS

MTL-01 INTERIOR FINISH MATERIAL, SEE A7-31

ALIGN

MECH. REGISTERS (S.M.D.)

LIGHT FIXTURES (S.E.D.)

KEYNOTE LEGEND

26.11 SURFACE MOUNTED LIGHT FIXTURE, 12"X48", LED FROSTED RIBBED ACRYLIC LENS, STEEL HOUSING, S.E.D.
26.30 EXTERIOR WALL MOUNTED LIGHTING FIXTURE, S.E.D.
32.10 ILLUMINATED CRASH BOLLARD, S.E.D.

1 4 8 16
SCALE: 1/8" = 1'-0"

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RCP DIMENSION PLAN

SHEET
A3-12

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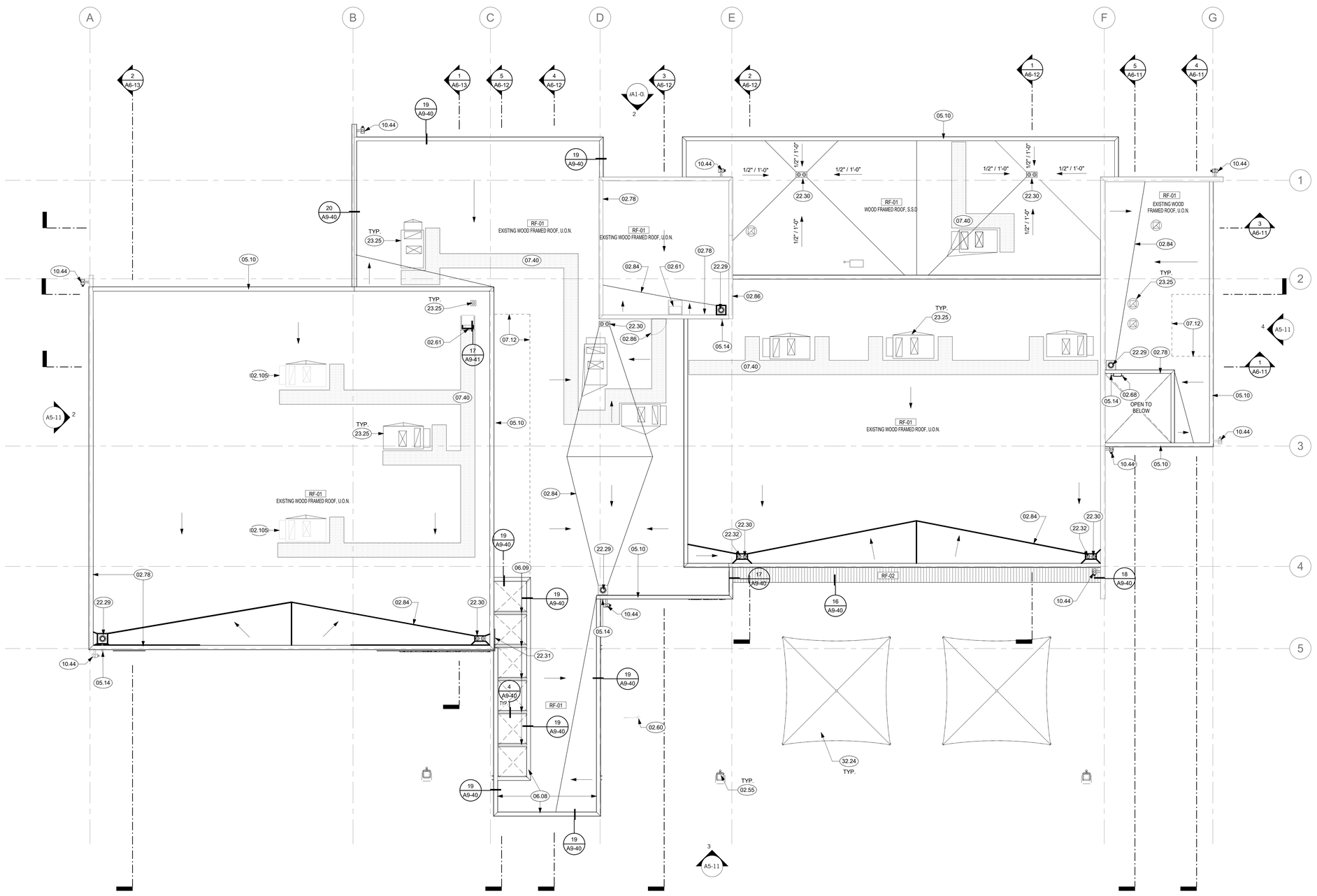

1 ROOF PLAN
1/8" = 1'-0"

ROOF PLAN NOTES

1. ALL ROOF HEIGHTS ARE MEASURED FROM THE MAIN T.O.C. OR T.O.S.F. AT DATUM +0'-0" U.O.N.
2. ALL TPO ROOFS SHALL SLOPE 1/2"/1'-0" MIN. AND ALL CRICKETS SHALL SLOPE 1/2"/1'-0" MIN. TO A ROOF DRAIN U.O.N. VERIFY WITH ROOFING MANUFACTURER PRIOR TO ROOF FRAMING TO CONFIRM COMPLIANCE WITH PRODUCT AND MANUFACTURE'S WARRANTY.
3. FOR EXISTING ROOF WOOD FRAMING, SEE RECORD DRAWINGS AND STRUCTURAL DRAWINGS. PROTECT EXISTING WOOD FRAMING AND SHEATHING DURING REPLACEMENT OF EXISTING ROOF FINISH DURING CONSTRUCTION.
4. CONTRACTOR TO VERIFY FINAL HEIGHT OF ALL MECHANICAL EQUIPMENT IS SCREENED AND BELOW ADJACENT ROOF AND PARAPET HEIGHTS.
5. PROVIDE PLYWOOD CLIPS AT ALL UNSUPPORTED EDGES OF ROOF SHEATHING (MIN.) S.S.D. FOR ADDITIONAL BLOCKING REQUIREMENTS.
6. LOCATE VENTS, FLUES AND STACKS ON THE BACKSIDE OF ROOFS U.O.N..
7. PROVIDE CLEANOUTS AT GRADE FOR ALL EXTERIOR DOWN SPOUTS.
8. PROVIDE MIN. R-30 THERMAL INSULATION AT THE ROOF.
9. FOR ALL LOW SLOPE ROOFS, PER 2023 COUNTY OF LOS ANGELES GREEN BUILDING STANDARDS CODE, NONRESIDENTIAL BUILDINGS SHALL MEET THE EXTERIOR ROOF REQUIREMENTS BELOW:
   A. SOLAR REFLECTANCE (MIN.): 0.68
   B. THERMAL EMITTANCE (MIN.): 0.85
   C. (OR) SRI: 82

ROOF PLAN SYMBOLS

RF-01	TPO ROOF, SEE A7-31
RF-02	STANDING SEAM METAL ROOF, SEE A7-31
	ROOF DRAIN, S.P.D.

T.O.P. = TOP OF PLATE

D.S. = DOWN SPOUT, SEE DETAILS

KEYNOTE LEGEND

02.55	PROTECT IN PLACE (E) POLE SITE LIGHTING TO REMAIN
02.60	PROTECT IN PLACE (E) FLAGPOLE TO REMAIN
02.61	PROTECT IN PLACE (E) ROOF HATCH AND LADDER TO REMAIN
02.68	PROTECT IN PLACE (E) LADDER TO REMAIN.
02.78	PROTECT IN PLACE (E) PARAPET CAP TO REMAIN AND PREPARE SURFACE FOR NEW FINISH.
02.84	MAINTAIN (E) ROOF SLOPES
02.86	PROTECT IN PLACE (E) DOOR TO REMAIN AND PREPARE SURFACE FOR FINISH. PAINT TO MATCH ADJACENT SURFACE.
02.105	EXISTING MECHANICAL UNIT TO REMAIN, PROTECT IN PLACE. S.M.D.
05.10	G.S.M. PARAPET CAP, PAINT TO MATCH ADJACENT SURFACE.
05.14	INSTALL NEW SCUPPER AT (E) SCUPPER LOCATION. S.P.D.
06.08	BUILD UP PARAPET WALL OVER EXISTING PARAPET CURB, SEE 19/A9-40
06.09	BUILD UP EXISTING FIN TO MATCH PARAPET HEIGHT
07.12	AREA OF INFILL ROOF, S.S.D.
07.40	TPO WELDABLE WALKWAY. FINAL PATH TO BE COORDINATED WITH FIELD LOCATIONS OF ROOFTOP UTILITIES.
10.44	WALL MOUNTED SECURITY CAMERA, S.E.D. FOR CONDUIT ROUTING AND SPECIFICATION, VERIFY FINAL LOCATION AND DIRECTION WITH THE CITY.
22.29	PROVIDE NEW ROOF DRAIN AT LOCATION OF (E) ROOF DRAIN, S.P.D.
22.30	ROOF DRAIN AND OVERFLOW, S.P.D.
22.31	OVERFLOW NOZZLE, S.P.D.
22.32	OVERFLOW PIPE THROUGH ROOF
23.25	MECHANICAL EQUIPMENT, S.M.D.
32.24	20' SQUARE CENTER POST UMBRELLA WITH FIXED MOUNTING PLATE, S.C.D.

SCALE: 1/4" = 1'-0"

PROJECT NORTH

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ROOF PLAN

SHEET
A4-11

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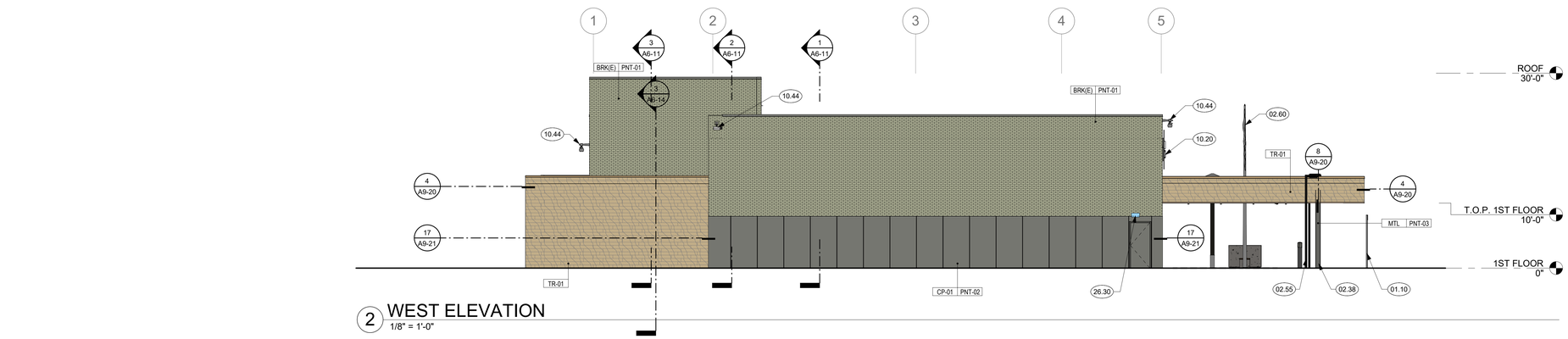
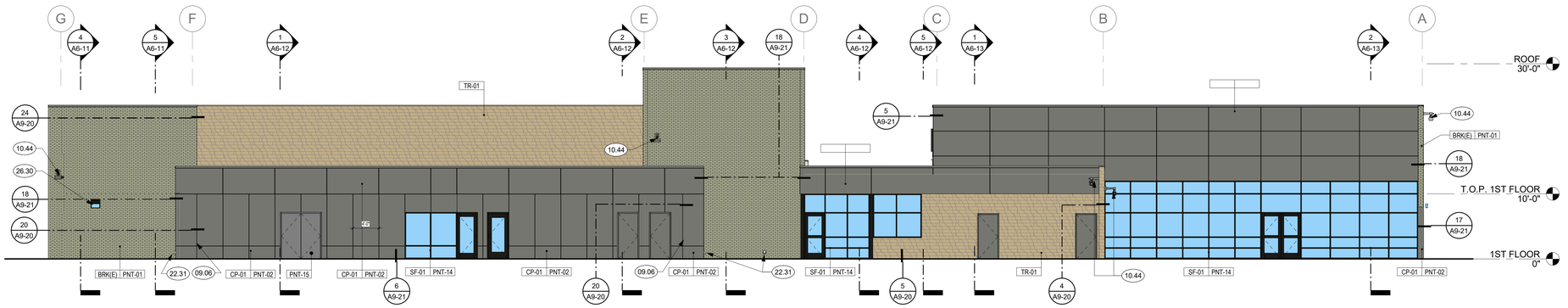
4 EAST ELEVATION
1/8" = 1'-0"

3 SOUTH ELEVATION
1/8" = 1'-0"



2 WEST ELEVATION
1/8" = 1'-0"



1 NORTH ELEVATION
1/8" = 1'-0"

ELEVATION GENERAL NOTES

1. SEE FINISH INFORMATION ON SHEET A7-31 FOR MATERIAL DESCRIPTIONS, KEYNOTED WITH SYMBOL
2. PAINT ALL EXPOSED MATERIAL SURFACES U.O.N.
3. ALL LOW SLOPED ROOFS TO BE RF-1 U.O.N.
4. FOR ALL EXTERIOR WINDOW AND DOORS, REF. WINDOW AND DOOR SCHEDULES, A7-00 SERIES SHEETS.
5. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D. AND S.C.D.
6. FOR FINISHES RELATED TO FIXTURES, S.M.D., S.P.D., S.L.D., S.C.D., AND S.E.D.
7. FOR ALL PARAPET AND ROOF HEIGHTS SEE ROOF PLANS, A4-00 SERIES SHEETS
8. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF FINAL FIBER CEMENT CONTROL JOINT LAYOUT TO ARCHITECT PRIOR TO CONSTRUCTION. CONTROL JOINT LAYOUT TO MEET ASTM CT63

KEYNOTE LEGEND

01.10	(E) VAN ACCESSIBLE PARKING SIGNAGE. ACCESSIBILITY UPGRADES PER BUILDING PERMIT BL 0401 1503300068.
02.38	PREPARE INTUMESCENT COATED STEEL COLUMNS FOR PAINT, PNT-14
02.55	PROTECT IN PLACE (E) POLE SITE LIGHTING TO REMAIN
02.60	PROTECT IN PLACE (E) FLAGPOLE TO REMAIN
05.14	INSTALL NEW SCUPPER AT (E) SCUPPER LOCATION, S.P.D.
09.06	ON THE INSIDE FACE, HPL PLANKS IN THE VERTICAL ORITENTATION (TR-02)
10.20	WALL MOUNTED ALUMINUM BUILDING SIGN, PIN MOUNTED OFF (E) BRICK WALL FINISH, REFER TO 5/A9-25 AND GRAPHICS PACKAGE
10.21	ALUMINUM WALL MOUNTED BUILDING ADDRESS, PIN MOUNTED, WHITE, REFER TO 4/A9-25.
10.44	WALL MOUNTED SECURITY CAMERA. S.E.D. FOR CONDUIT ROUTING AND SPECIFICATION. VERIFY FINAL LOCATION AND DIRECTION WITH THE CITY.
22.31	OVERFLOW NOZZLE, S.P.D.
22.32	OVERFLOW PIPE THROUGH ROOF
26.30	EXTERIOR WALL MOUNTED LIGHTING FIXTURE, S.E.D.
32.10	ILLUMINATED CRASH BOLLARD, S.E.D.
32.21	GFRC PLANTER, S.L.D.
32.22	BACKLESS WOOD BENCH WITH ATTACHMENT EMBEDED IN CONCRETE SEAT WALL, S.L.D.
32.23	CONCRETE SEAT WALL, S.L.D.
32.24	20' SQUARE CENTER POST UMBRELLA WITH FIXED MOUNTING PLATE, S.C.D.

1 4 8 16
SCALE: 1/8" = 1'-0"

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EXTERIOR ELEVATIONS

SHEET
A5-11

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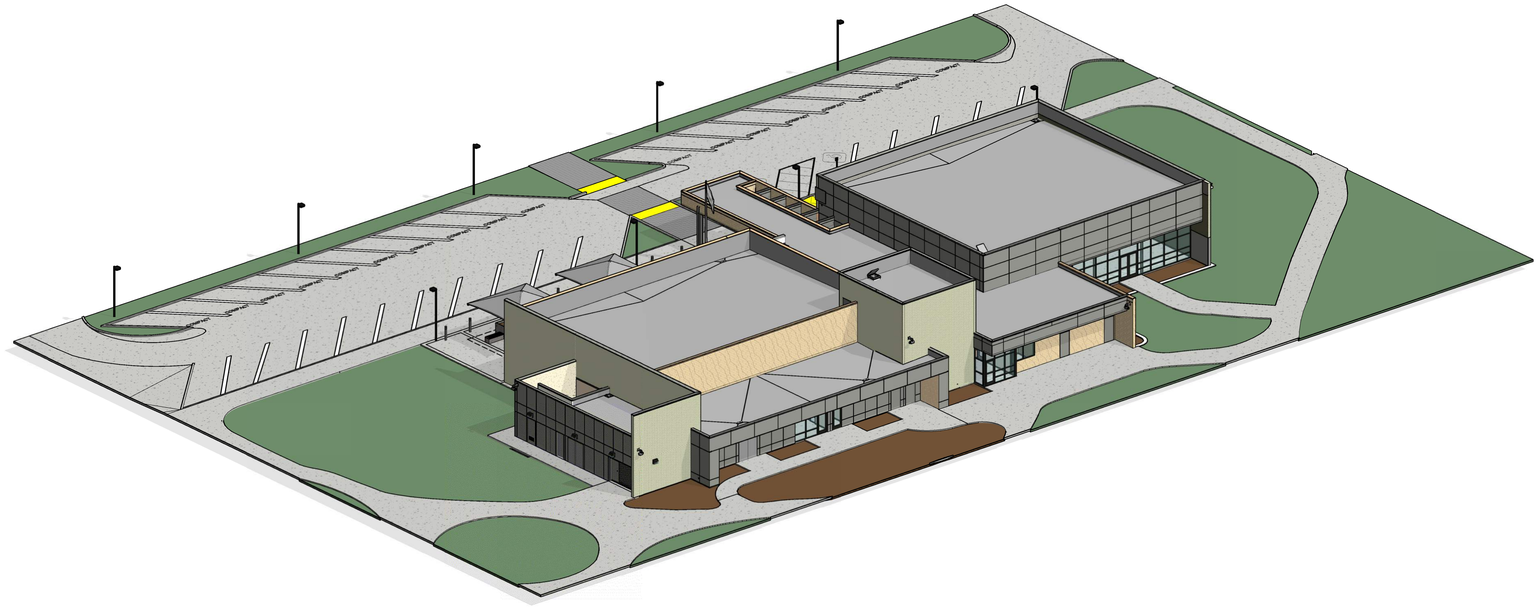
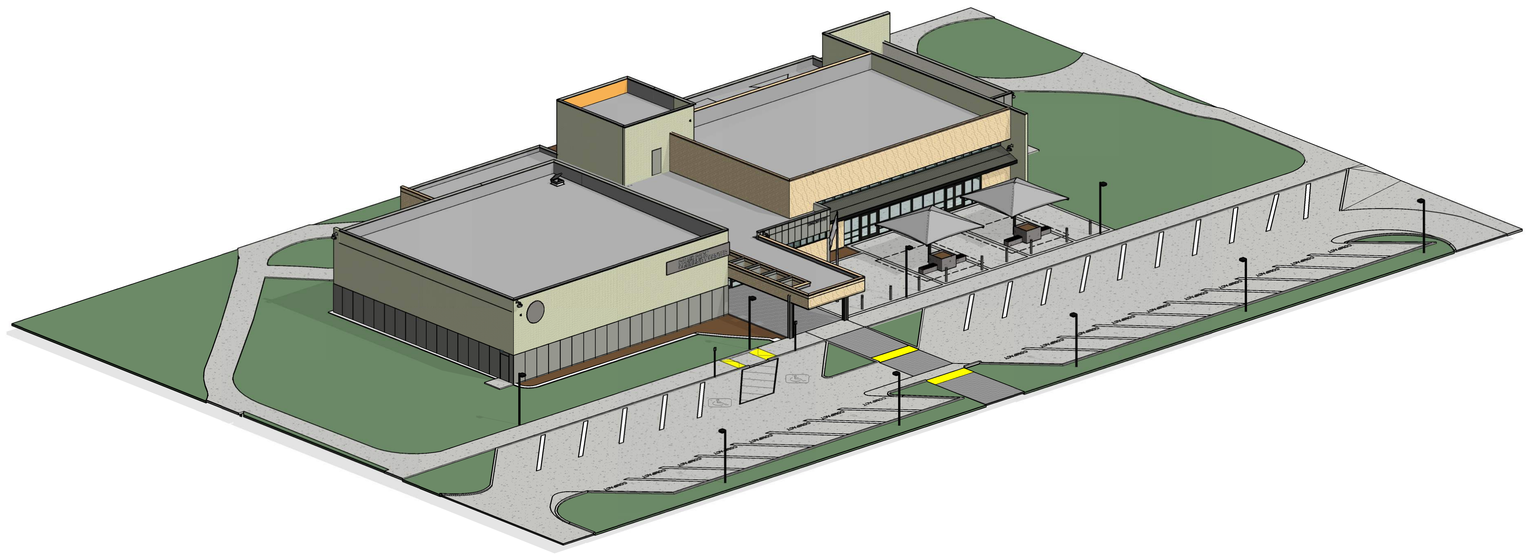


2 AXONOMETRIC 3D



1 AXONOMETRIC 3D

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AXONOMETRIC VIEWS

SHEET

A5-21

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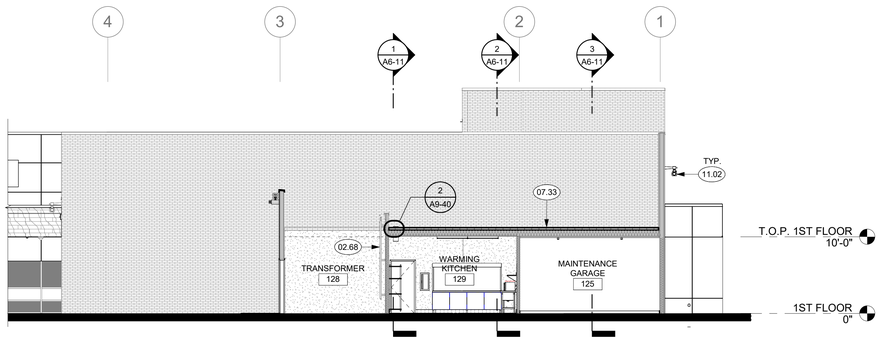
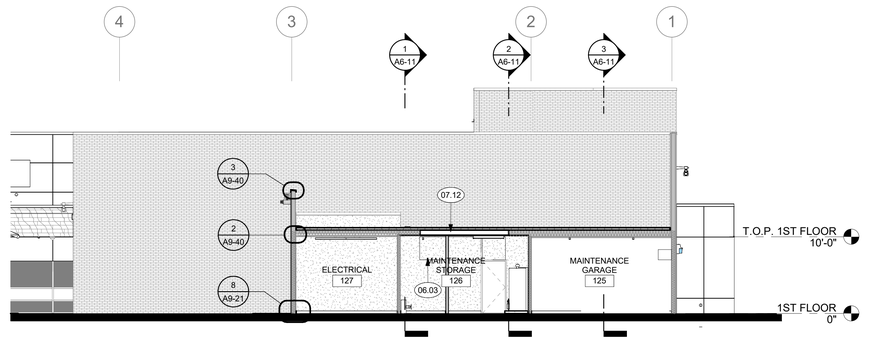
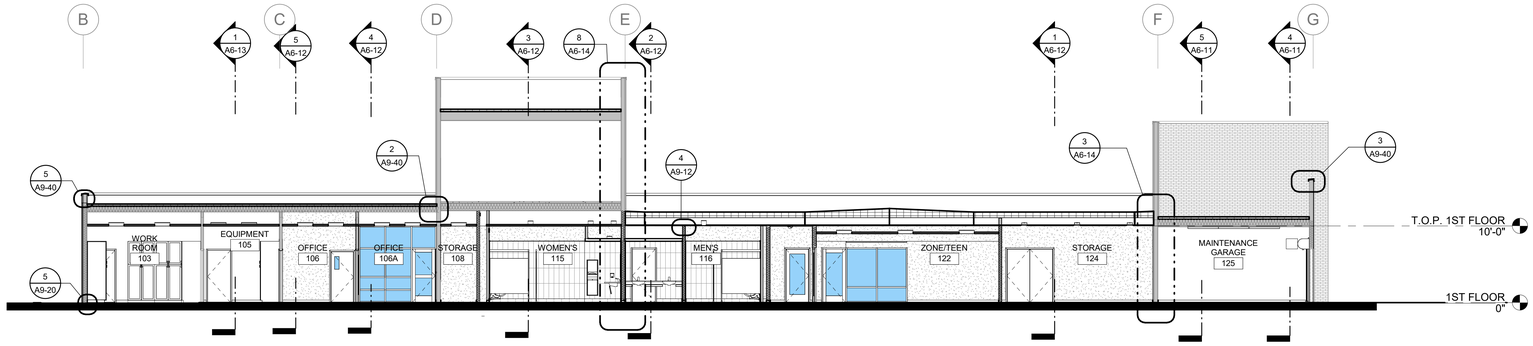


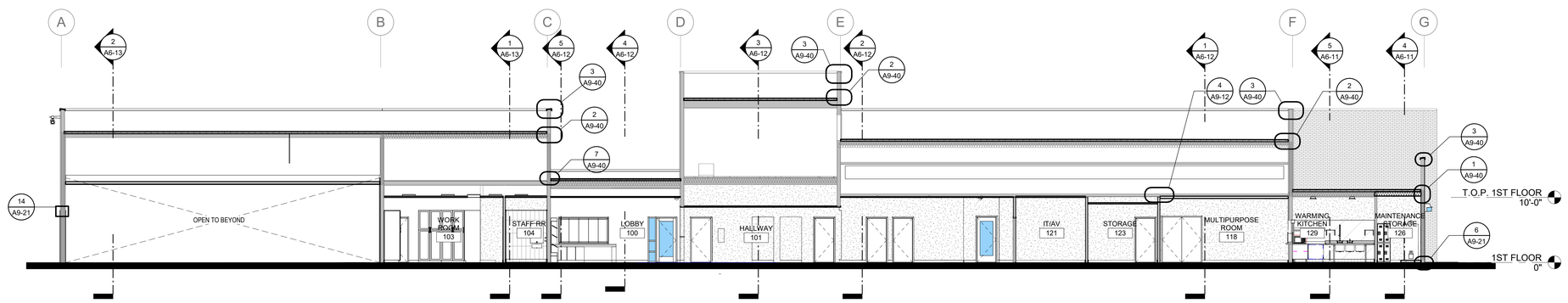
5 SECTION E
1/8" = 1'-0"



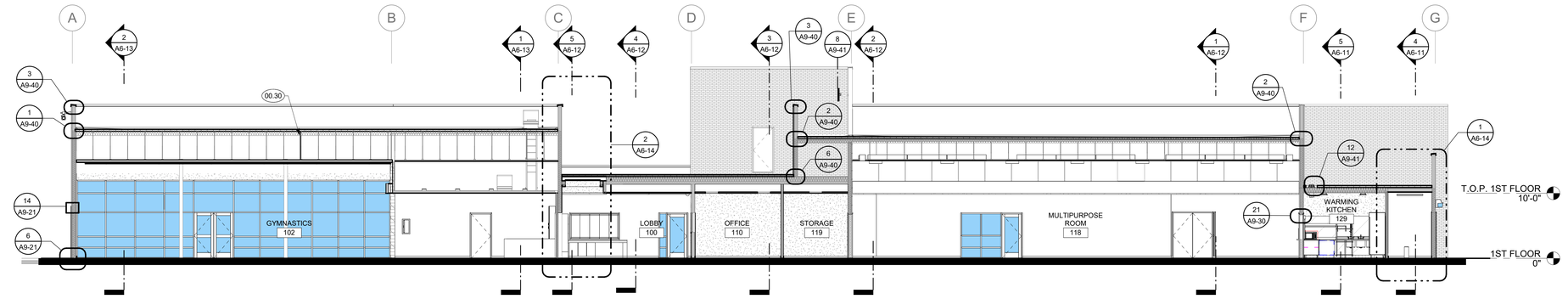
4 SECTION D
1/8" = 1'-0"



3 SECTION C
1/8" = 1'-0"



2 SECTION B
1/8" = 1'-0"



1 SECTION A
1/8" = 1'-0"

BUILDING SECTION NOTES

1. ALL INTERIOR WALLS TO HAVE SOUND BATTS. REFER TO FLOOR PLAN PARTITION TAG AND PARTITION SCHEDULE ON A3-01.
2. REFER TO AS-BUILT AND STRUCTURAL DRAWINGS FOR EXISTING AND NEW STRUCTURAL FRAMING AND ELEMENTS.
3. FRAMING ON BUILDING SECTIONS AND WALL SECTIONS ARE FOR GRAPHIC REPRESENTATION ONLY. SEE STRUCTURAL DRAWINGS FOR ALL FRAMING INFORMATION.
4. STRUCTURAL DRAWINGS SHALL TAKE PRECEDENCE IN MATTERS OF FRAMING MEMBER SIZES, CONFIGURATION AND CONNECTIONS, AS WELL AS CONCRETE SLABS, WALLS, AND FOUNDATIONS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION BETWEEN ARCHITECTURAL AND STRUCTURAL WALLS.
6. NO EXTRA COST WILL BE PAID FOR THE CONTRACTOR'S FAILURE TO COORDINATE WORK WITH STRUCTURAL ENGINEERING DRAWINGS AND OTHER CONSULTANTS WORK.
7. REFER TO MECHANICAL DRAWINGS FOR RETURN AND SUPPLY REGISTER LOCATIONS.
8. REFER TO MECHANICAL DRAWINGS FOR HVAC UNITS, DUCTS, EXHAUST FANS, ETC. EQUIPMENT SHOWN ON WALL AND BUILDING SECTIONS ARE FOR GRAPHIC REFERENCE ONLY. LOCATION TO BE DETERMINED BY ARCHITECTURAL DRAWINGS.
9. REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE INFORMATION. LOCATION TO BE DETERMINED BY ARCHITECTURAL DRAWINGS.
10. VERIFY ALL LOCATIONS OF STACK PIPES, EXHAUST FAN PIPES, ETC. WITH MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
11. ALL PLUMBING VENTS TO BE LOCATED IN ROOF WELL ONLY, U.N.O.
12. FRAMING CONTRACTOR TO SUPPLY AND INSTALL BACKING AT ALL WALL MOUNTED CABINETS, ACCESSORIES, ETC. AND COORDINATE WITH SUPPLIES FOR BACKING REQUIREMENTS.
13. SEE ROOF PLAN FOR ALL ROOF OVERHANG DIMENSIONS, ROOF DRAIN LOCATIONS, AND ROOF FINISHES
14. PROVIDE BLOCKING AS REQUIRED BY CODE.

SECTION LEGEND

- (E) 9" BATT INSULATION AT (E) ROOF FRAMING PER RECORD DRAWINGS
- (E) 6" BATT INSULATION AT (E) WALLS PER RECORD DRAWINGS
- R-19 BATT INSULATION TYP. AT NEW EXTERIOR WALLS, U.O.N.
- SOUND INSULATION AT ALL INTERIOR WALLS, U.O.N.

KEYNOTE LEGEND

00.30	ATTIC DRAFT STOP
02.68	PROTECT IN PLACE (E) LADDER TO REMAIN.
06.03	WALL INFILL FRAMING
07.12	AREA OF INFILL ROOF, S.S.D.
07.33	SINGLY PLY ROOF MEMBRANE FINISH, RF-01
11.02	SECURITY CAMERAS AND ACCESSORIES, OFCI. CONTRACTOR TO PROVIDE CONDUIT AND CABLING. S.E.D.

SCALE: 1/8" = 1'-0"

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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

BUILDING SECTIONS

SHEET
A6-11

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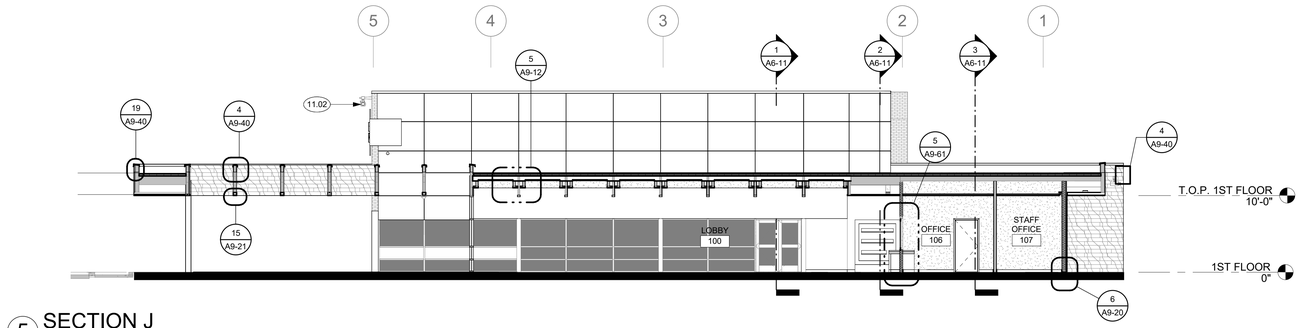

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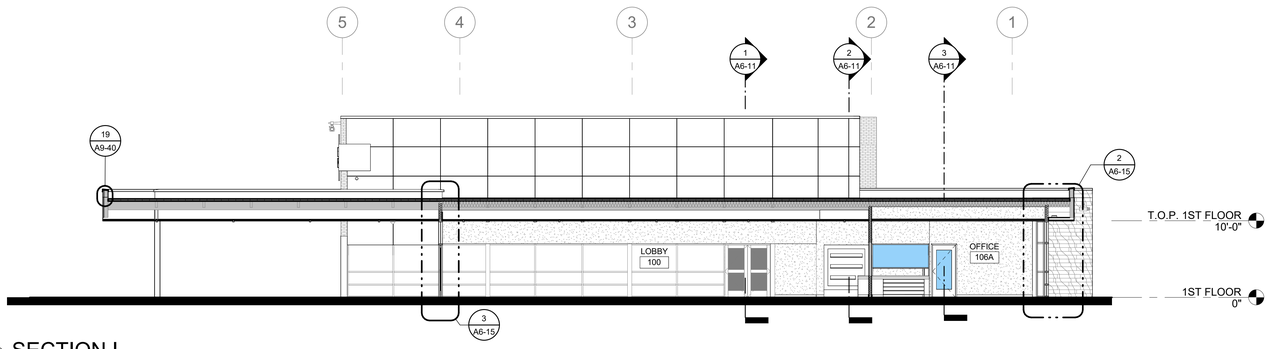

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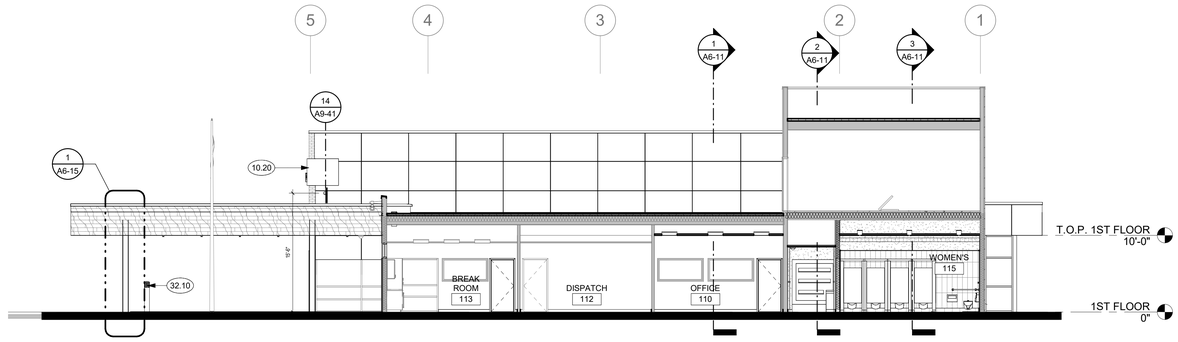

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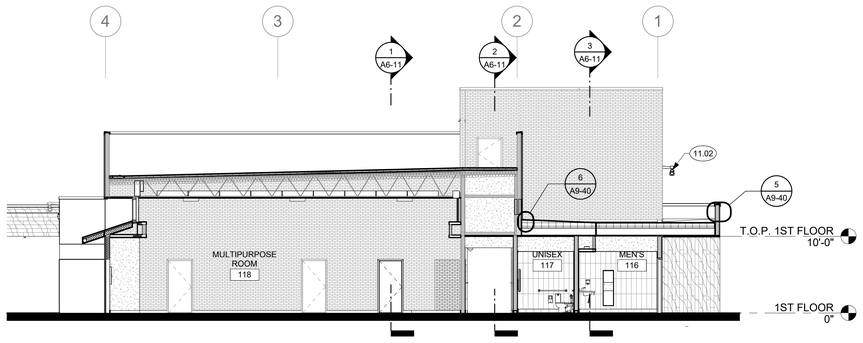

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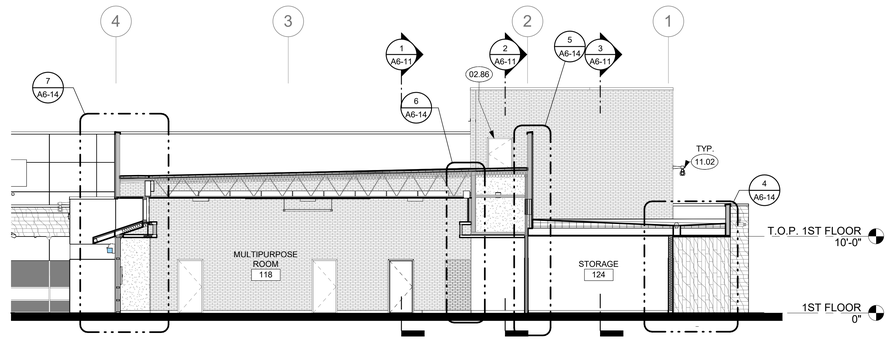

1 SECTION F
1/8" = 1'-0"

SCALE: 1/8" = 1'-0"

BUILDING SECTION NOTES

1. ALL INTERIOR WALLS TO HAVE SOUND BATTS. REFER TO FLOOR PLAN PARTITION TAG AND PARTITION SCHEDULE ON A3-01.
2. REFER TO AS-BUILT AND STRUCTURAL DRAWINGS FOR EXISTING AND NEW STRUCTURAL FRAMING AND ELEMENTS.
3. FRAMING ON BUILDING SECTIONS AND WALL SECTIONS ARE FOR GRAPHIC REPRESENTATION ONLY. SEE STRUCTURAL DRAWINGS FOR ALL FRAMING INFORMATION.
4. STRUCTURAL DRAWINGS SHALL TAKE PRECEDENCE IN MATTERS OF FRAMING MEMBER SIZES, CONFIGURATION AND CONNECTIONS, AS WELL AS CONCRETE SLABS, WALLS, AND FOUNDATIONS.
5. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATION BETWEEN ARCHITECTURAL AND STRUCTURAL WALLS.
6. NO EXTRA COST WILL BE PAID FOR THE CONTRACTOR'S FAILURE TO COORDINATE WORK WITH STRUCTURAL ENGINEERING DRAWINGS AND OTHER CONSULTANTS WORK.
7. REFER TO MECHANICAL DRAWINGS FOR RETURN AND SUPPLY REGISTER LOCATIONS.
8. REFER TO MECHANICAL DRAWINGS FOR HVAC UNITS, DUCTS, EXHAUST FANS, ETC. EQUIPMENT SHOWN ON WALL AND BUILDING SECTIONS ARE FOR GRAPHIC REFERENCE ONLY. LOCATION TO BE DETERMINED BY ARCHITECTURAL DRAWINGS.
9. REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE INFORMATION. LOCATION TO BE DETERMINED BY ARCHITECTURAL DRAWINGS.
10. VERIFY ALL LOCATIONS OF STACK PIPES, EXHAUST FAN PIPES, ETC. WITH MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
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12. FRAMING CONTRACTOR TO SUPPLY AND INSTALL BACKING AT ALL WALL MOUNTED CABINETS, ACCESSORIES, ETC. AND COORDINATE WITH SUPPLIES FOR BACKING REQUIREMENTS.
13. SEE ROOF PLAN FOR ALL ROOF OVERHANG DIMENSIONS, ROOF DRAIN LOCATIONS, AND ROOF FINISHES
14. PROVIDE BLOCKING AS REQUIRED BY CODE.

SECTION LEGEND

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- (E) 6" BATT INSULATION AT (E) WALLS PER RECORD DRAWINGS
- R-19 BATT INSULATION TYP. AT NEW EXTERIOR WALLS, U.O.N.
- SOUND INSULATION AT ALL INTERIOR WALLS, U.O.N.

KEYNOTE LEGEND

02.86	PROTECT IN PLACE (E) DOOR TO REMAIN AND PREPARE SURFACE FOR FINISH. PAINT TO MATCH ADJACENT SURFACE
10.20	WALL MOUNTED ALUMINUM BUILDING SIGN, PIN MOUNTED OFF (E) BRICK WALL FINISH, REFER TO 5/A9-25 AND GRAPHICS PACKAGE
11.02	SECURITY CAMERAS AND ACCESSORIES, OFCI. CONTRACTOR TO PROVIDE CONDUIT AND CABLING. S.E.D.
32.10	ILLUMINATED CRASH BOLLARD, S.E.D.

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DRAWN Author
CHECK Checker

BUILDING SECTIONS

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A6-12

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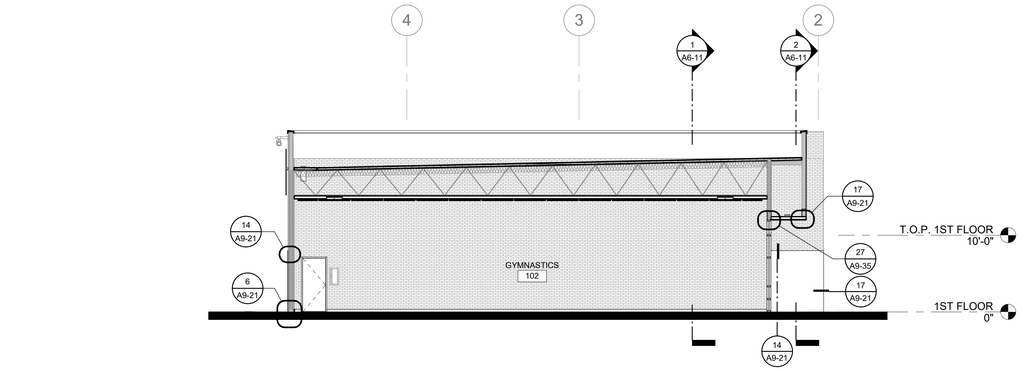

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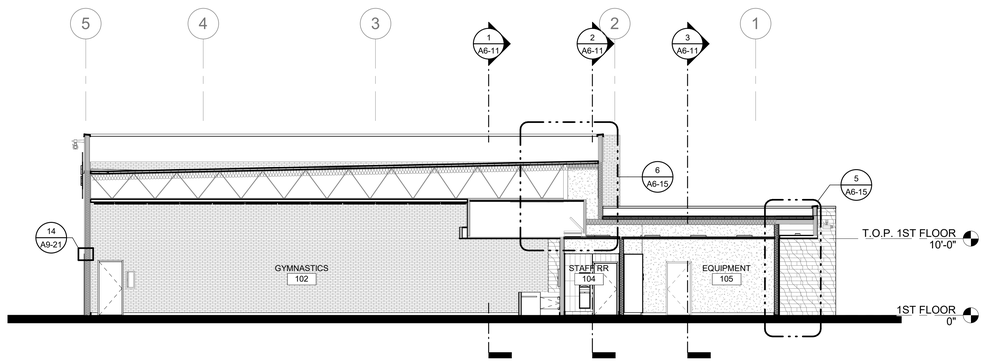

1 SECTION K
1/8" = 1'-0"

BUILDING SECTION NOTES

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2. REFER TO AS-BUILT AND STRUCTURAL DRAWINGS FOR EXISTING AND NEW STRUCTURAL FRAMING AND ELEMENTS.
3. FRAMING ON BUILDING SECTIONS AND WALL SECTIONS ARE FOR GRAPHIC REPRESENTATION ONLY. SEE STRUCTURAL DRAWINGS FOR ALL FRAMING INFORMATION.
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9. REFER TO ELECTRICAL DRAWINGS FOR LIGHTING FIXTURE INFORMATION. LOCATION TO BE DETERMINED BY ARCHITECTURAL DRAWINGS.
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14. PROVIDE BLOCKING AS REQUIRED BY CODE.

SECTION LEGEND

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- R-19 BATT INSULATION TYP. AT NEW EXTERIOR WALLS, U.O.N.
- SOUND INSULATION AT ALL INTERIOR WALLS, U.O.N.

KEYNOTE LEGEND

1 4 8 16
SCALE: 1/8" = 1'-0"

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DRAWN **Author**
CHECK **Checker**

BUILDING SECTIONS

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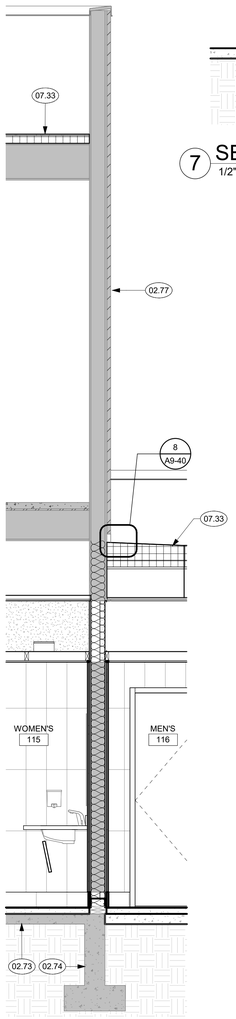

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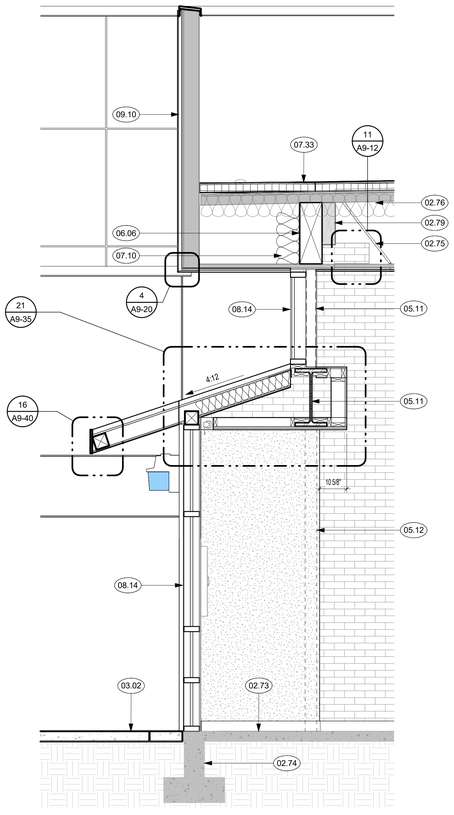

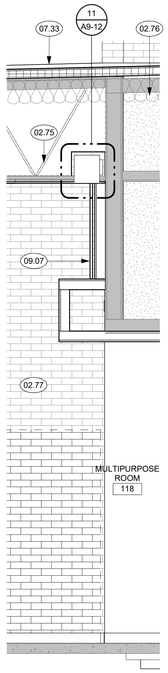

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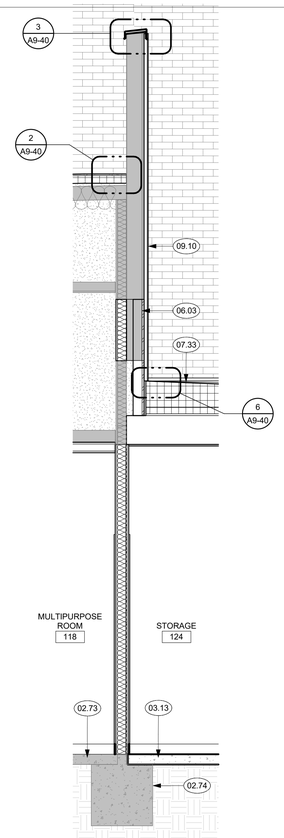

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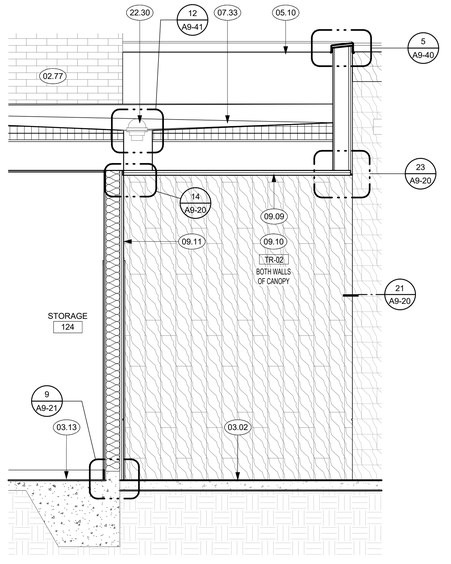
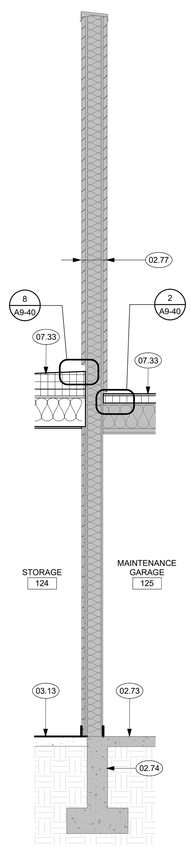


4 SECTION F - 1
1/2" = 1'-0"

8 SECTION C - 2
1/2" = 1'-0"



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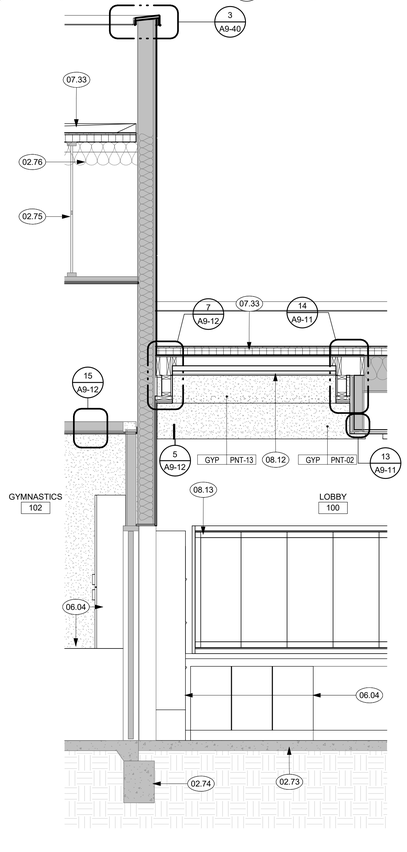
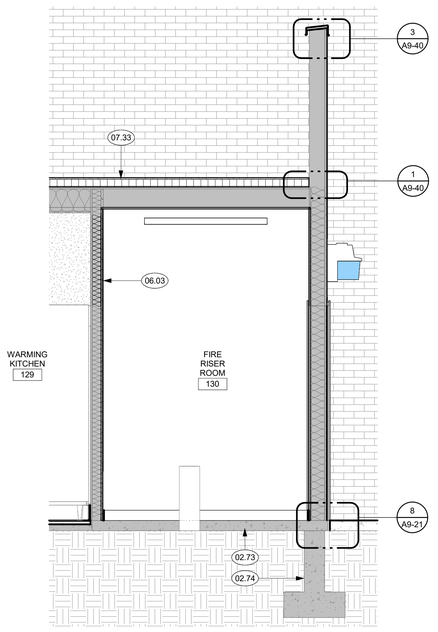


2 SECTION A - 2
1/2" = 1'-0"



1 SECTION A - 1
1/2" = 1'-0"

BUILDING SECTION NOTES

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7. REFER TO ELECTRICAL DRAWINGS FOR LOCATION OF ALL LIGHTING FIXTURES.
8. VERIFY ALL LOCATIONS OF STACK PIPES, EXHAUST FAN PIPES, ETC. WITH MECHANICAL AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.
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10. SEE ROOF PLAN FOR ALL ROOF OVERHANG DIMENSIONS, RAIN WATER LEADER AND DOWNSPOUT LOCATIONS.
11. PROVIDE BLOCKING AS REQUIRED BY CODE.
12. FOR INSULATION REQUIREMENTS SEE ENERGY COMPLIANCE SHEETS.
13. FOR SOFFIT OR DROPPED CEILING HEIGHTS, SEE REFLECTED CEILING PLANS ON A3 SERIES SHEETS.

KEYNOTE LEGEND

02.73 PROTECT IN PLACE (E) BUILDING SLAB TO REMAIN
02.74 PROTECT IN PLACE (E) CONCRETE FOOTING, REFERNCE RECORD DRAWINGS AND S.S.D.
02.75 PROTECT IN PLACE (E) ROOF TRUSS TO REMAIN
02.76 PROTECT IN PLACE (E) INSULATION TO REMAIN
02.77 PROTECT (E) BRICK VENEER TO REMAIN, PREPARE SURFACE FOR FINISH, SEE A5 SERIES SHEETS FOR EXTERIOR ELEVATIONS.
02.79 PROTECT IN PLACE (E) STRUCTURE TO REMAIN
03.02 CONCRETE HARDSCAPE, S.C.D. AND S.L.D.
03.13 CONCRETE SLAB ON GRADE, S.S.D.
05.10 G.S.M. PARAPET CAP, PAINT TO MATCH ADJACENT SURFACE.
05.11 STRUCTURAL FRAMING, S.S.D.
05.12 STRUCTURAL FRAMING WITHIN FURRED WALL, S.S.D.
06.03 WALL INFILL FRAMING
06.04 CASEWORK, SEE A8 SHEETS FOR INTERIOR ELEVATIONS
06.06 STRUCTURAL BEAM, S.S.D.
07.10 THERMAL INSULATION, SEE PLANS, A2 SERIES, AND ENERGY COMPLIANCE SHEETS
07.33 SINGLY PLY ROOF MEMBRANE FINISH, RF-01
08.12 ARTIFICIAL SKYLIGHT, SEE RCP AND S.E.D. FOR ADDITIONAL INFORMATION.
08.13 OPERABLE WINDOW, SEE FLOOR PLAN FOR ADDITIONAL INFORMATION.
08.14 ALUMINUM STOREFRONT, REFERENCE PLAN AND STOREFRONT SCHEDULE.
09.07 WALL MOUNTED ACOUSTIC PANEL, SEE A8 SERIES SHEETS FOR INTERIOR ELEVATIONS.
09.09 HIGH PRESSURE LAMINATE CEILING FINISH, SEE SHEET A3-12 FOR RCP.
09.10 HIGH PRESSURE LAMINATE WALL FINISH, SEE SHEET A5-11 FOR EXTERIOR ELEVATIONS.
09.11 FIBER CEMENT PANEL WALL FINISH, SEE A5 SERIES SHEETS FOR EXTERIOR ELEVATIONS.
22.30 ROOF DRAIN AND OVERFLOW, S.P.D.

SCALE: 1/2" = 1'-0"

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DRAWN	**Author**
CHECK	**Checker**

WALL SECTIONS

SHEET
A6-14

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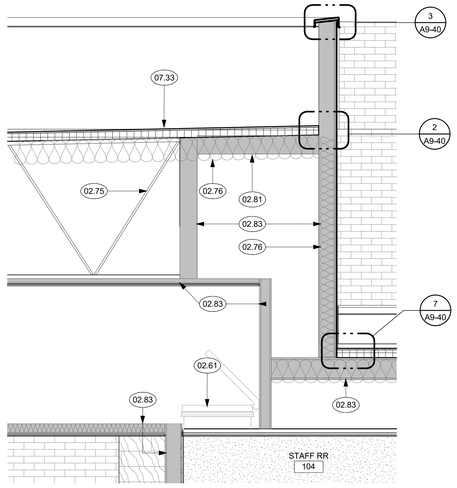

6 SECTION K - 2
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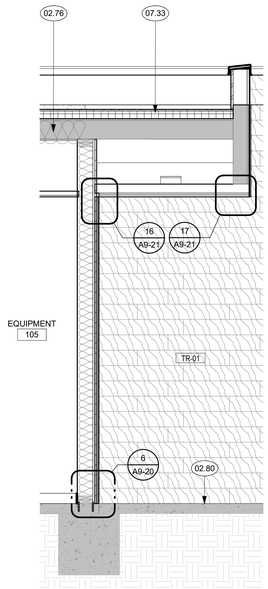
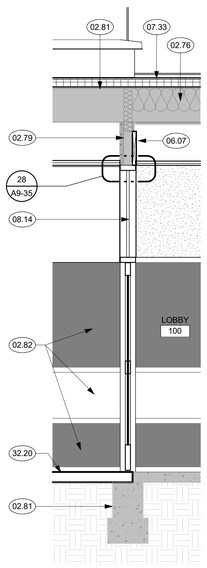


5 SECTION K - 1
1/2" = 1'-0"



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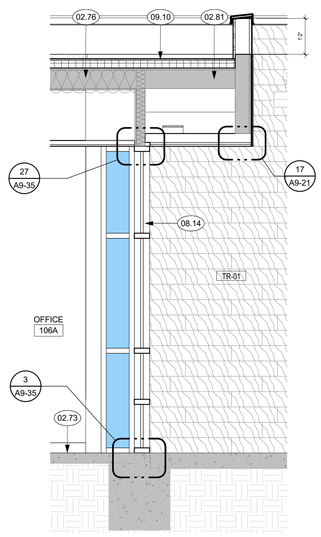
1/2" = 1'-0"



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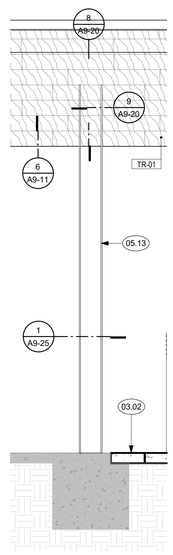
1/2" = 1'-0"



1 SECTION H - 1
1/2" = 1'-0"

SCALE: 1/2" = 1'-0"

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KEYNOTE LEGEND

02.61 PROTECT IN PLACE (E) ROOF HATCH AND LADDER TO REMAIN
02.73 PROTECT IN PLACE (E) BUILDING SLAB TO REMAIN
02.75 PROTECT IN PLACE (E) ROOF TRUSS TO REMAIN
02.76 PROTECT IN PLACE (E) INSULATION TO REMAIN
02.79 PROTECT IN PLACE (E) STRUCTURE TO REMAIN
02.80 PROTECT (E) CONCRETE HARDSCAPE TO REMAIN WHERE OCCURS, S.L.D. AND S.S.D.
02.81 PROTECT IN PLACE (E) ROOF FRAMING TO REMAIN
02.82 PROTECT IN PLACE (E) STOREFRONT TO REMAIN
02.83 PROTECT IN PLACE (E) BUILDING FRAMING TO REMAIN
03.02 CONCRETE HARDSCAPE, S.C.D. AND S.L.D.
05.13 (E) COLUMN WRAPPED WITH PLATE STEEL
06.07 STRUCTURAL FRAMING ATTACHED TO (E) STRUCTURE, S.S.D.
07.33 SINGLY PLY ROOF MEMBRANE FINISH, RF-01
08.14 ALUMINUM STOREFRONT, REFERENCE PLAN AND STOREFRONT SCHEDULE
09.10 HIGH PRESSURE LAMINATE WALL FINISH, SEE SHEET A5-11 FOR EXTERIOR ELEVATIONS.
32.20 BRICK PAVERS, S.L.D.

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12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

WALL SECTIONS

SHEET
A6-15

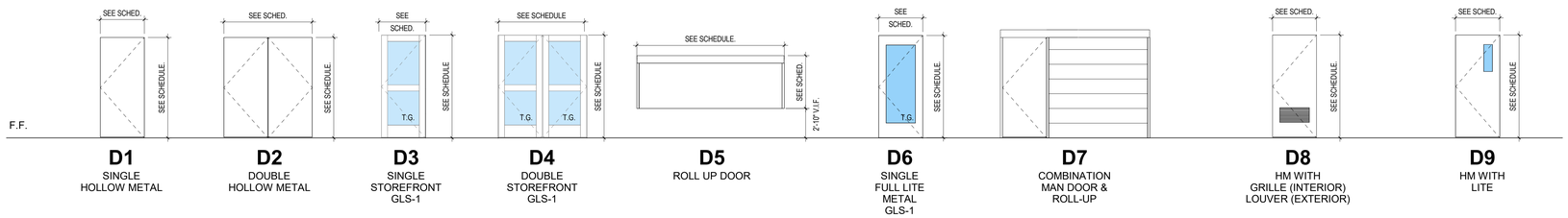
6/26/2025 4:41:37 PM

DOOR SCHEDULE

DOOR NO.	DOOR TYPE	EXISTING	WIDTH	HEIGHT	HARDWARE GROUP	DOOR		FRAME		PANIC	FIRE RATING	DETAILS			COMMENTS	EXTERIOR *
						DOOR MATERIAL	DOOR FINISH	FRAME MATERIAL	FRAME FINISH			HEAD	JAMB	SILL		
1ST FLOOR																
100a	D4	New Construction	6'-0"	6'-10"	2.0	ALSF-3	F.F.	ALSF	F.F.	YES	Not Rated	13/A9-32	12/A9-32	11/A9-32	EXTERIOR, STOREFRONT DOOR, FOB READER AND MULLION MOUNTED ACCESSIBLE PUSH BUTTON, PANIC HARDWARE	YES
101a	D6	New Construction	3'-0"	7'-0"	6.0	AL/G	PNT.	HM	PNT.	YES	Not Rated	4/A9-31	3/A9-31	7/A9-32	EXTERIOR, FULL LITE, METAL DOOR, FOB READER, PANIC HARDWARE	YES
102a	D4	Existing	5'-11"	6'-10"	-	ALSF	PNT.	ALSF	PNT.	YES	Not Rated	Existing	Existing	Existing	INTERIOR, STOREFRONT DOOR, PANIC HARDWARE	YES
102b	D1	New Construction	3'-0"	7'-0"	9.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	7/A9-31	6/A9-31	6/A9-32	EXTERIOR, HOLLOW METAL DOOR, MATCH EXISTING OPENING SIZE	YES
102c	D4	New Construction	6'-0"	7'-0"	5.0	ALSF-3	F.F.	ALSF	F.F.	YES	Not Rated	13/A9-32	12/A9-32	11/A9-32	EXTERIOR, STOREFRONT DOOR, PANIC HARDWARE	YES
103a	D1	New Construction	3'-0"	6'-10"	26.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	2/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
103b	D1	New Construction	3'-0"	6'-10"	11.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	2/A9-31	1/A9-31	7/A9-32	EXTERIOR, HOLLOW METAL DOOR. FOB READER	YES
103c	D1	Existing	3'-0"	6'-10"	-	HM (E)	PNT.	HM (E)	PNT.	NO	Not Rated	Existing	Existing	Existing	INTERIOR, HOLLOW METAL DOOR	NO
104a	D1	New Construction	3'-0"	6'-10"	27.0	HM	PNT.	HM	PNT.	NO	Not Rated	1/A9-31	1/A9-31	5/A9-32	INTERIOR, HOLLOW METAL DOOR, UNDER CUT PER MECH	NO
105a	D1	New Construction	3'-0"	6'-10"	12.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	2/A9-31	1/A9-31	7/A9-32	EXTERIOR, HOLLOW METAL DOOR	YES
105b	D1	New Construction	3'-0"	6'-10"	22.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	4/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
106a	D3	New Construction	3'-0"	6'-10"	14.0	ALSF-4	F.F.	ALSF	F.F.	NO	Not Rated	7/A9-33	6/A9-33	5/A9-33	INTERIOR, STOREFRONT DOOR, FOB READER	NO
106b	D3	New Construction	3'-0"	7'-0"	1.0	ALSF-3	F.F.	ALSF	F.F.	NO	Not Rated	13/A9-32	12/A9-32	11/A9-32	EXTERIOR, STOREFRONT DOOR, FOB READER	YES
106c	D6	New Construction	3'-0"	6'-10"	-	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	9/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
107a	D9	New Construction	3'-0"	6'-8"	23.0	HM	PNT.	HM	PNT.	NO	Not Rated	1/A9-31	1/A9-31	9/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
108a	D1	New Construction	3'-0"	6'-10"	20.0	HM	PNT.	HM	PNT.	NO	Not Rated	3/A936	3/A936	2/A9-32	INTERIOR, HOLLOW METAL DOOR, UNDER CUT PER MECH	NO
109a	D1	New Construction	3'-0"	6'-10"	20.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	3/A9-32	INTERIOR, HOLLOW METAL DOOR, MATCH EXISTING OPENING SIZE UNDERCUT PER MECH	NO
110a	D1	New Construction	3'-0"	6'-10"	24.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	2/A9-32	INTERIOR, HOLLOW METAL DOOR, MATCH EXISTING OPENING SIZE	NO
111a	D1	New Construction	3'-0"	6'-10"	24.0	HM	PNT.	HM	PNT.	NO	Not Rated	3/A9-36	2/A9-31	2/A9-31	INTERIOR, HOLLOW METAL DOOR	NO
111b	D1	Existing	3'-0"	6'-10"	-	HM (E)	PNT.	HM (E)	PNT.	NO	Not Rated	Existing	Existing	Existing	INTERIOR, HOLLOW METAL DOOR	NO
112a	D1	Existing	3'-0"	6'-10"	-	HM (E)	PNT.	HM (E)	PNT.	NO	Not Rated	Existing	Existing	Existing	INTERIOR, HOLLOW METAL DOOR	NO
113a	D1	New Construction	3'-0"	6'-10"	18.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	4/A9-32	INTERIOR, HOLLOW METAL DOOR. FOB READER. MATCH EXISTING OPENING SIZE	NO
113b	D1	Existing	3'-0"	6'-10"	-	HM (E)	PNT.	HM (E)	PNT.	NO	Not Rated	Existing	Existing	Existing	INTERIOR, HOLLOW METAL DOOR	NO
114a	D1	Existing	3'-0"	6'-10"	-	HM (E)	PNT.	HM (E)	PNT.	NO	Not Rated	Existing	Existing	Existing	INTERIOR, HOLLOW METAL DOOR	NO
115a	D1	New Construction	3'-0"	6'-10"	30.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	5/A9-32	INTERIOR, HOLLOW METAL DOOR, SELF-CLOSING DEVICE	NO
115b	D1	New Construction	3'-0"	7'-0"	13.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	4/A9-31	3/A9-31	8/A9-32	EXTERIOR, HOLLOW METAL DOOR	NO
116a	D1	New Construction	3'-0"	6'-10"	30.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	5/A9-32	INTERIOR, HOLLOW METAL DOOR, SELF-CLOSING DEVICE	NO
116b	D1	New Construction	3'-0"	7'-0"	13.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	4/A9-31	3/A9-31	8/A9-32	EXTERIOR, HOLLOW METAL DOOR	NO
117a	D1	New Construction	3'-0"	6'-10"	27.0	HM	PNT.	HM	PNT.	NO	Not Rated	3/A9-36	2/A9-31	2/A9-31	INTERIOR, HOLLOW METAL DOOR, UNDER CUT PER MECH, SELF-CLOSING DEVICE	NO
118a	D3	New Construction	3'-0"	6'-10"	17.0	ALSF-4	F.F.	ALSF	F.F.	YES	Not Rated	7/A9-33	6/A9-33	5/A9-33	INTERIOR, STOREFRONT DOOR, PANIC HARDWARE	NO
118b	D2	New Construction	6'-0"	7'-0"	19.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	3/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
118c	D4	New Construction	6'-0"	7'-0"	4.0	ALSF-3	F.F.	ALSF	F.F.	YES	Not Rated	13/A9-32	12/A9-32	11/A9-32	EXTERIOR, STOREFRONT DOOR, PANIC HARDWARE. SELF-CLOSING DEVICE	YES
118d	D4	New Construction	6'-0"	7'-0"	2.0	ALSF-3	F.F.	ALSF	F.F.	YES	Not Rated	13/A9-32	12/A9-32	11/A9-32	EXTERIOR, STOREFRONT DOOR, FOB READER, PANIC HARDWARE, SELF-CLOSING DEVICE	YES
119a	D1	New Construction	3'-0"	6'-10"	21.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	2/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
120a	D1	New Construction	3'-0"	6'-10"	21.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	3/A9-32	INTERIOR, HOLLOW METAL DOOR, UNDER CUT PER MECH	NO
121a	D1	New Construction	3'-0"	6'-10"	22.0	HM	PNT.	HM	PNT.	NO	Not Rated	1/A9-31	1/A9-31	2/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
122a	D3	New Construction	3'-0"	7'-0"	1.0	ALSF-3	F.F.	ALSF	F.F.	NO	Not Rated	14/A9-32	12/A9-32	11/A9-32	EXTERIOR, STOREFRONT DOOR	YES
122b	D3	New Construction	3'-0"	7'-0"	15.0	ALSF-4	F.F.	ALSF	F.F.	NO	Not Rated	7/A9-33	6/A9-33	5/A9-33	INTERIOR, STOREFRONT DOOR	NO
122c	D1	New Construction	3'-0"	6'-10"	19.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31	2/A9-31	2/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
124a	D2	New Construction	6'-0"	7'-0"	10.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	4/A9-31	3/A9-31	6/A9-32	EXTERIOR, HOLLOW METAL DOOR, FOB READER	YES
125a	D7	New Construction	12'-1 1/2"	8'-5 45/128"	MFR.	ST.	F.F.	ST.	F.F.	NO	Not Rated	12/A9-31	11/A9-31	-	REPLACE (E) IN-KIND, V.I.F. EXISTING OPENING. POWERED.	YES
126a	D2	New Construction	6'-0"	7'-0"	10.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	4/A9-31	3/A9-31	7/A9-32	EXTERIOR, HOLLOW METAL DOOR, FOB READER. MATCH EXISTING OPENING SIZE	YES
127a	D8	New Construction	3'-0"	7'-0"	8.0	HM	PNT-15	HM	PNT-15	YES	Not Rated	4/A9-31	3/A9-31	6/A9-32	EXTERIOR, HOLLOW METAL, LOUVERED DOOR, SMD. MATCH EXISTING OPENING SIZE	YES
128a	D2	New Construction	6'-0"	7'-0"	7.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	9/A9-31	8/A9-31	6/A9-32	EXTERIOR, HOLLOW METAL DOOR, MATCH EXISTING OPENING SIZE	YES
129a	D1	New Construction	3'-0"	6'-10"	25.0	HM	PNT.	HM	PNT.	NO	Not Rated	2/A9-31.1	2/A9-31	10/A9-32	INTERIOR, HOLLOW METAL DOOR	NO
129b	D1	Existing	3'-0"	6'-10"	-	HM (E)	PNT.	HM (E)	PNT.	NO	Not Rated	Existing	Existing	Existing	INTERIOR, HOLLOW METAL DOOR	NO
129c	D5	New Construction	9'-0"	3'-6"	31.0	MTL	F.F.	MTL	F.F.	NO	Not Rated	7/A9-31	6/A9-31	-	ROLL UP DOOR	NO
130a	B6	New Construction	3'-0"	7'-0"	8.0	HM	PNT-15	HM	PNT-15	NO	Not Rated	4/A9-31	3/A9-31	6/A9-32	EXTERIOR, HOLLOW METAL DOOR	YES

* NOTE: SEE DOOR SCHEDULE NOTES #14 & #15

DOOR TYPES



DOOR ABBREVIATIONS

MATERIALS

AL.	ALUMINUM
AL.K.D.	ALUMINUM KNOCK-DOWN
ALSF	ALUMINUM STOREFRONT
ALSF - 3	ALUMINUM STOREFRONT - THERMAL
ALSF - 4	ALUMINUM STOREFRONT - NON-THERMAL
HM	HOLLOW METAL
H.C. WD.	HOLLOW CORE WOOD
I.G.	INSULATED GLASS
O.H.C.D.	OVERHEAD COILING DOOR
SST.	STAINLESS STEEL
ST.	STEEL
T.G.	TEMPERED GLASS
S.C.WD.	SOLID CORE WOOD
FG	FIBERGLASS

FINISHES

F.F.	FACTORY FINISH
P.LAM	PLASTIC LAMINATE
PNT.	PAINT FINISH
PAT.	PATINA FINISH
S.S.	STAINLESS STEEL
S.G.	STAIN GRADE WOOD

ACCESSORIES

KP	FACTORY KICK PLATE
LITE	VISION LITE
MS	MANUFACTURER SUPPLIED

DOOR SCHEDULE NOTES

1. ALL DOORS TO RECEIVE FOUR HINGES AT EACH LEAF, EXCEPT FOR PARTIAL HEIGHT DOORS. SEE PLANS.
2. PROVIDE SILENCERS IN ALL FRAMES WHICH DO NOT HAVE WEATHERSTRIPPING
3. ALL DOOR HARDWARE, OPERATORS, AND MOUNTING HEIGHTS SHALL BE ADA AND CBC COMPLIANT.
4. ALL CLOSERS AND OVERHEAD STOPS ARE TO BE MOUNTED ON THE NON-PUBLIC SIDE OF INTERIOR DOORS.
5. ALL EXIT DOORS SHALL BE OPERABLE FROM THE EGRESS SIDE WITHOUT A KEY OR SPECIAL KNOWLEDGE OR EFFORT PER CBC 1010.1.9.
6. FOR ADDITIONAL DOOR AND HARDWARE REQUIREMENTS, REFER TO DRAWINGS ON SHEETS G142 AND G151.
7. SEE DOOR SCHEDULE, A7 SHEET SERIES, FOR FIRE RATED DOORS. DOORS WITHIN UNITS ARE NOT FIRE RATED, WITH THE EXCEPTION OF THE ENTRY DOOR. ALL FIRE RATED DOORS TO BE ON SELF CLOSING DEVICES (SEE CODE MATRIX G0-02)
8. SEE ELEVATIONS AND WINDOW SCHEDULE (WINDOW TYPES) ON A7-21 FOR STOREFRONT SYSTEM MULLIONS ADJACENT TO/AT DOORS.
9. ALL DOORS REQUIRED TO BE ACCESSIBLE SHALL BE EQUIPPED WITH HANDLES, PULLS, LATCHES, LOCKS AND OTHER OPERATING DEVICES THAT DO NOT REQUIRE TIGHT GRASPING, TIGHT PINCHING OR TWISTING OF THE WRIST TO OPERATE. SEE CBC 1010.1.9.1 HARDWARE.
10. DOOR HANDLE PULLS, LATCHES, LOCKS, AND OTHER OPERATING DEVICES ON DOORS REQUIRED TO BE ACCESSIBLE SHALL BE INSTALLED 34" MINIMUM AND 48" MAXIMUM ABOVE THE FINISHED FLOOR. LOCKS USED ONLY FOR SECURITY PURPOSES AND NOT USED FOR NORMAL OPERATION ARE PERMITTED AT ANY MOUNTING HEIGHT ABOVE THE FINISHED FLOOR. SEE CBC 1010.1.9.2 HARDWARE HEIGHT.
11. PROVIDE DOOR THRESHOLDS AND CONCEALED DOOR BOTTOMS AT ALL EXTERIOR DOORS.
12. FOR DOOR HARDWARE SEE GROUP NUMBER (THIS SHEET) AND PROJECT MANUAL.
13. ALL EXTERIOR GLASS TO BE TEMPERED OR LAMINATED AS NOTED
14. EXTERIOR DOORS THAT SEPARATE CONDITIONED FROM UNCONDITIONED SPACE OR FROM AMBIENT AIR SHALL HAVE A U-FACTOR NOT GREATER THAN 0.70, PER 2022 CALIFORNIA ENERGY CODE, TABLE 140.3-B
15. DOORS THAT ARE MORE THAN ONE-HALF GLASS IN AREA ARE CONSIDERED GLAZED DOORS

STOREFRONT LEGEND

ALSF-1	ARCADIA AG601T SERIES (OR EQUAL) STOREFRONT - THERMAL 2" x 6"
ALSF-2	ARCADIA AR450 SERIES (OR EQUAL) STOREFRONT - NON-THERMAL 2" x 4-1/2"
GLS-1	PPG SOLARBAN 60 SOLAR CONTROL LOW-E GLASS 1" INSULATED GLASS UNIT 1/2" AIRSPACE W/ (2) 1/4" LITES (2) CLEAR + CLEAR U-FACTOR ≤ 0.55 SHGC ≤ 0.67 VT ≥ 0.77
GLS-2	PPG MONOLITHIC CLEAR GLASS 1/4" GLASS
FF-1	FACTORY FINISH ANODIZED DARK BRONZE

PROJECT NORTH

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

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12305 207TH ST, LAKEWOOD, CA 90715

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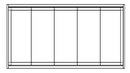
DOOR SCHEDULE

SHEET
A7-11

6/26/2025 4:41:40 PM

WINDOW TYPES

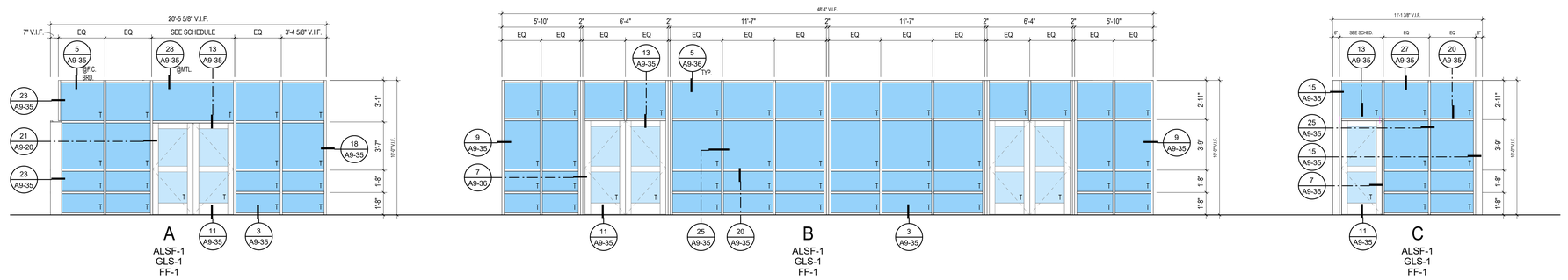


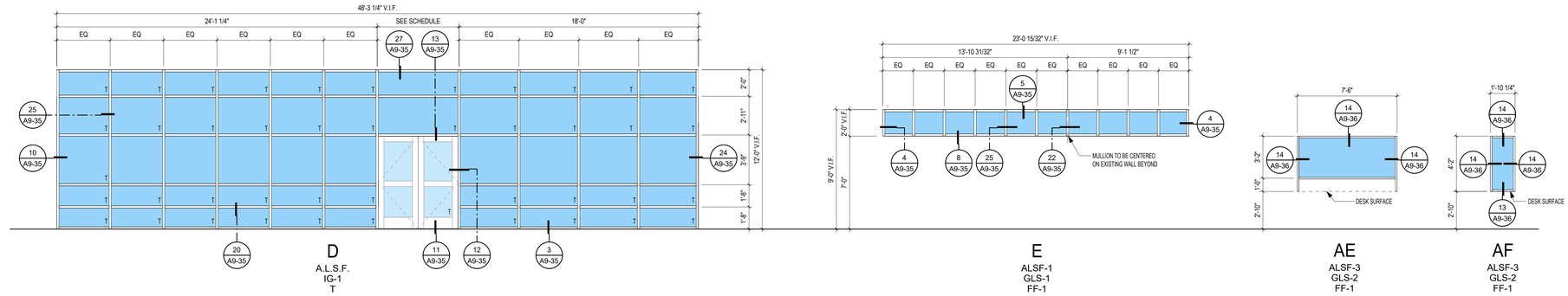
W1
WND-1
GLS-2
FF-1

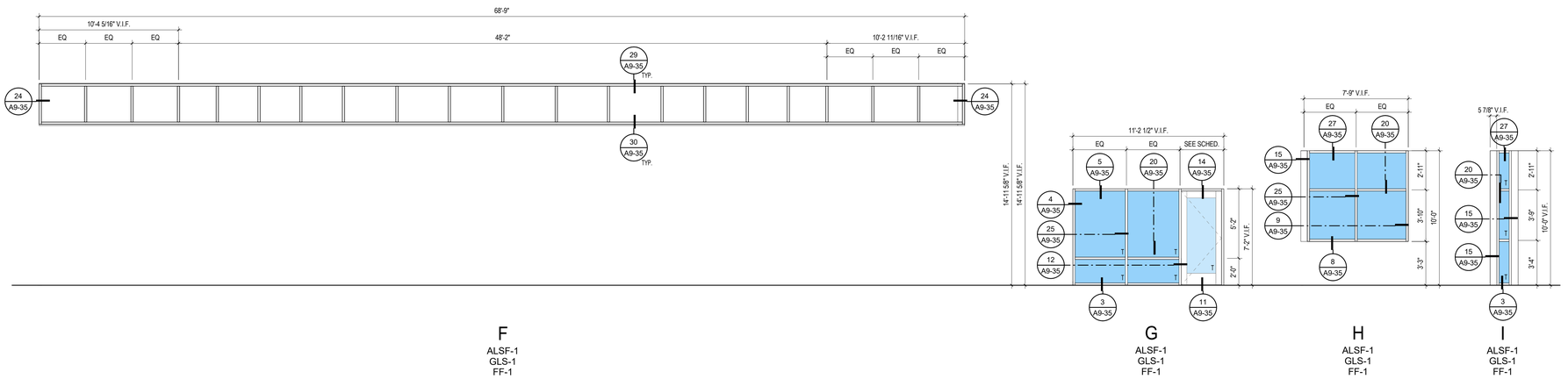
WINDOW SCHEDULE

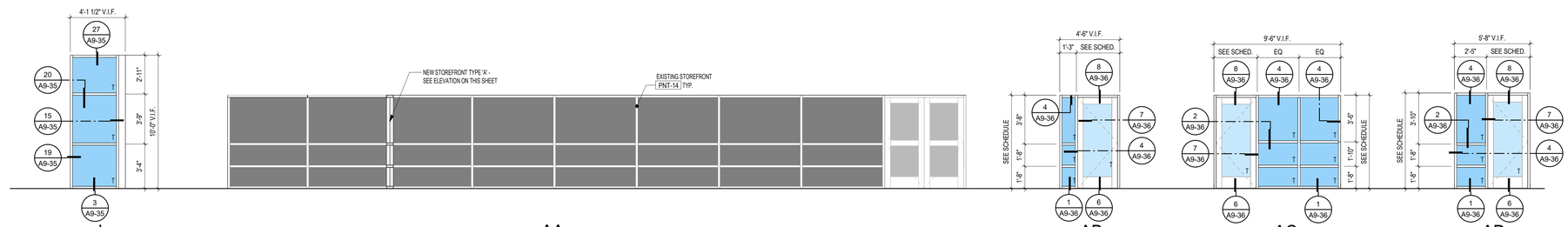
WINDOW TYPE	WIDTH	HEIGHT	OPERATION	*WINDOW GLAZING (key schedule)	DETAILS HEAD	DETAILS JAMB	DETAILS SILL	COMMENTS
1ST FLOOR								
W1	7'-8 31/128"	4'-2"	FOLDING SLIDING	(none)	10/A9-33		9/A9-33	COVERGLASS USA (OR EQUAL)- FRAMELESS SLIDING GLASS WINDOW; COUNTER HEIGHT; CLEAR GLASS; TRACK COLOR TO BE SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD RANGE;

STOREFRONT TYPES









WINDOW SCHED. ABBREV.

A.L.S.F.	ALUMINUM STOREFRONT
DOOR	DOOR OPENING, SEE A7-11
EQ	EGRESS WINDOW
FX	FIXED
IG-1	INSULATED GLASS, SEE PROJECT MANUAL FOR SCHEDULE
T	TEMPERED GLASS

WINDOW SCHEDULE NOTES

1. PROVIDE SAFETY GLAZING (I.E. TEMPERED GLASS) FOR ALL HAZARDOUS LOCATIONS PER CBC 2406.4.
2. REFER TO SECTIONS FOR ADDITIONAL INFORMATION
3. FOR GLAZING AT DOORS INCLUDING INTEGRAL SIDELIGHT UNITS, SEE DOOR SCHEDULE.
4. INSTALLER SHALL COORDINATE ALL REQUIRED ROUGH OPENING DIMENSIONS WITH FRAMING CONTRACTOR PRIOR TO START OF BUILDING FRAMING. INDICATE ALL REQUIREMENTS ON SHOP DRAWINGS.

STOREFRONT LEGEND

ALSF-1	ARCADIA AG601T SERIES (OR EQUAL) STOREFRONT - THERMAL 2" x 6"
ALSF-2	ARCADIA AR450 SERIES (OR EQUAL) STOREFRONT - NON-THERMAL 2" x 4-1/2"
GLS-1	PPG SOLARBAN 60 SOLAR CONTROL LOW-E GLASS 1" INSULATED GLASS UNIT 1/2" AIRSPACE W/ (2) 1/4" LITES (2) CLEAR + CLEAR U-FACTOR ≤ 0.55 SHGC ≤ 0.67 VT ≥ 0.77
GLS-2	PPG MONOLITHIC CLEAR GLASS 1/4" GLASS
FF-1	FACTORY FINISH ANODIZED DARK BRONZE

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STOREFRONT SCHEDULE

SHEET
A7-21

6/26/2025 4:41:45 PM

FINISHES_SCHEDULE

TAG	DESCRIPTION	SOURCE	MODEL	STYLE/COLOR	FINISH	SIZE	CLASSIFICATION	CONTACT	NOTES
	<varies>						<varies>		
CASEWORK									
LAM-01	WOOD GRAIN LAMINATE	WILSONART	BASIC LAMINATE SHEETS	NEW AGE OAK 7938	MATTE	N/A	CLASS A	WWW.WILSONART.COM	PAMPHLET HOLDER IN LOBBY CHECK IN DESK
LAM-02	WOOD GRAIN LAMINATE	WILSONART	BASIC LAMINATE SHEETS	WALNUT HEIGH	MATTE	N/A	CLASS A	WWW.WILSONART.COM	
MTL-03	STEEL PLATE SHELF	SEE SPECIFICATIONS	SEE SPECIFICATIONS	PNT-15	-	1/4" THICK	CLASS A	-	
CEILING									
ACT-01	SUSPENDED ACOUSTIC TILE CEILING	ARMSTRONG	ULTIMA LAY-IN AND TEGULAR	WHITE	SQUARE LAY-IN	2' X 2'	CLASS A	WWW.ARMSTRONGCEILINGS.COM	
ACT-02	ACOUSTICAL CEILING PANELS	ARMSTRONG	FELTWORKS	WHITE	-	4' X 8' X 1"	CLASS A	WWW.ARMSTRONGCEILINGS.COM	MAGNETIC ATTACHMENT TO METAL FURRING PER MANUF. INSTRUCTIONS
ACT-03	ACOUSTICAL CEILING PANELS	ARMSTRONG	FELTWORKS	GREY	-	4' X 8' X 1"	CLASS A	WWW.ARMSTRONGCEILINGS.COM	MAGNETIC ATTACHMENT TO METAL FURRING PER MANUF. INSTRUCTIONS
ACT-04	ACOUSTICAL CEILING PANELS	ARMSTRONG	FELTWORKS	BEIGE	-	4' X 8' X 1"	CLASS A	WWW.ARMSTRONGCEILINGS.COM	MAGNETIC ATTACHMENT TO METAL FURRING PER MANUF. INSTRUCTIONS
CP(E)	GYPSUM CEILING BOARD	-	TYPE 'X' GYPSUM BOARD	N/A	N/A	4' X 8'	<varies>	-	
CP-01	FIBER CEMENT PANEL	JAMES HARDIE			PAINTED		<varies>		
MTL-01	SUSPENDED METAL PANEL CEILING	ARMSTRONG	METALWORKS LINEAR - SYNCHRO	GINGER	M1 UNPERFORATED	6" X 96" X 1"	-	WWW.ARMSTRONGCEILINGS.COM	EXTERIOR RATED
MTL-02	SUSPENDED METAL PANEL CEILING	ARMSTRONG	METALWORKS LINEAR - SYNCHRO	GINGER	M2 PERFORATED	6" X 96" X 1"	CLASS A	WWW.ARMSTRONGCEILINGS.COM	INTERIOR
COLUMN									
MTL	STRUCTURAL STEEL	N/A	N/A	N/A	N/A	N/A	-	-	PROTECT (E) INTUMESCENT PAINTED COLUMNS
COUNTER									
SS-01	QUARTZ SLAB	BEDROSIAN TILE & STONE	REVERA	LIMESTONE GREY	POLISHED	63" X 126" X 3 CM	CLASS A	WWW.BEDRISUABS.COM/EN	BEVEL EDGES
FLOOR									
CONC-01	SEALED CONCRETE	EUCLID CHEMICAL	ULTRASIL LI+	CLEAR	N/A	N/A	CLASS A	-	
CPT-01	CARPET	INTERFACE	BIKE PATH	104657 OREGANO / LIME	CERAMOR	9.845" X 39.38"	CLASS 1	WWW.INTERFACE.COM	
LVT-01	LUXURY VINYL TILE	INTERFACE	STUDIO SET	SAND	CERAMOR	9.845" X 39.38"	CLASS A	WWW.INTERFACE.COM	
LVT-02	LUXURY VINYL TILE	INTERFACE	STUDIO SET	PEWTER	CERAMOR	9.845" X 39.38"	CLASS A	WWW.INTERFACE.COM	
LVT-03	LUXURY VINYL TILE	INTERFACE	STUDIO SET	PEBBLE	CERAMOR	9.845" X 39.38"	CLASS A	WWW.INTERFACE.COM	
PT-01	PORCELAIN TILE	DALTILE	PORTFOLIO	ASH GREY	MATTE	12" X 24"	CLASS A	WWW.DALTILE.COM	OFFSET NO GREATER THAN 30% OR PER MANUFACTURER RECOMMENDATIONS
PT-02	PORCELAIN TILE	DALTILE	PORTFOLIO	DOVE GREY	MATTE	12" X 24"	CLASS A	WWW.DALTILE.COM	OFFSET NO GREATER THAN 30% OR PER MANUFACTURER RECOMMENDATIONS
QT-01	QUARRY TILE	DALTILE	QUARRY TILE	ARID GRAY 0Q42	ABRASIVE / TEXTURED	6"X6"	CLASS A	WWW.DALTILE.COM	
ROOF									
RF-01	SINGLE PLY TPO ROOF MEMBRANE	CARLISLE	FLEECEBACK TPO	WHITE	MECHANICALLY FASTENED	-	-	WWW.CARLISLESYNTEC.COM	
RF-02	STANDING METAL SEAM ROOFING	PAC-CLAD	SNAP-CLAD	MIDNIGHT BRONZE	-	12" SEAM WIDTH	-	WWW.PAC-CLAD.COM	
STOREFRONT									
SF-01	ALUMINUM STOREFRONT	ARCADIA	ALUMINUM STOREFRONT	ARCADIA - AG451T SERIES	DARK BRONZE AB-6	COMMERCIAL BRONZE	CLASS A	WWW.ARCADIAINC.COM	
WALL									
BRK(E)	EXISTING BRICK VENEER	EXISTING	BRICK VENEER	EXISTING	PAINTED	EXISTING	-	-	PREPARE (E) BRICK FOR PAINT FINISH
CP	CEMENT PLASTER	EXISTING	CEMENT PLASTER	MATCH ADJACENT	PAINTED, MATCH ADJACENT	-	-	-	CLEAN, PATCH, AND REPAIR PRIOR TO PAINTING
CP-01	CEMENTITIOUS PANELS	JAMES HARDIE	HARDIE ARCHTIECTURAL COLLECTION	FINE SAND	PAINTED	4' X 12"	-	WWW.JAMESHARDIE.COM	ADD ANTI GRAFITI COATING
CT-01	CERAMIC TILE	DALTILE	COLOR WHEEL LINEAR	DESERT GREY X114	SEMI-GLOSS	8" x 24"	CLASS A	WWW.DALTILE.COM	
CT-02	CERAMIC TILE	DALTILE	COLOR WHEEL LINEAR	SEA BREEZE 1174	SEMI-GLOSS	8" x 24"	CLASS A	WWW.DALTILE.COM	
CT-03	CERAMIC TILE	DALTILE	COLOR WHEEL LINEAR	SUEDE GRAY 0182	SEMI-GLOSS	8" x 24"	CLASS A	WWW.DALTILE.COM	
CT-04	CERAMIC TILE SANITARY COVE BASE	DALTILE	COLOR WHEEL LINEAR / SHAPE S-3619TN	DESERT GREY X114	SEMI-GLOSS	6" X 6" X 5/15"	CLASS A	WWW.DALTILE.COM	MINIMUM 3/8" RADIUS AT THE JUNCTION OF THE WALL AND FLOOR.
GYP	GYPSUM WALL BOARD	-	TYPE 'X' GYPSUM BOARD	N/A	N/A	4' X 8'	<varies>	-	
MDG-01	TRIM AT TILE	SCHLUTER	RONDEC	SATIN ANNODIZED ALUMINUM	N/A	BASED ON TILE	CLASS A	WWW.SCHLUTER.COM	
MDG-02	MOULDING	EL & EL WOOD PRODUCTS	1098LDF	PAINTED	N/A	1 1/2" X 11/16	CLASS A	WWW.ELANDELWOODPRODUCTS.COM	CLASS A
PT-03	PORCELAIN TILE	DALTILE	SANITARY COVE TILE	DOVE GREY	MATTE	6"X 12"	CLASS A	WWW.DALTILE.COM	MINIMUM 3/8" RADIUS AT THE JUNCTION OF THE WALL AND FLOOR.
QT-02	QUARRY TILE COVE BASE	DALTILE	QUARRY TILE / SHAPE Q3565	ARID GRAY 0Q42	MATTE	5" X 6"	CLASS A	WWW.DALTILE.COM	MINIMUM 3/8" RADIUS AT THE JUNCTION OF THE WALL AND FLOOR.
TR-01	HIGH PRESSURE LAMINATE PLANKS	TRESPA	PURA	CLASSIC OAK	HORIZONTAL DIRECTION	7.3" X 120"	-	WWW.TRESPA.COM	
TR-02	HIGH PRESSURE LAMINATE PLANKS	TRESPA	PURA	CLASSIC OAK	VERTICAL DIRECTION	7.3" X 120"	-	WWW.TRESPA.COM	
WB-01	RUBBER WALL BASE	MANNINGTON COMMERCIAL	BURKEBASE TYPE TP	JET GRAY 192	-	6" TALL WALL BASE	CLASS A	WWW.MANNINGTONCOMMERCIAL.COM	MINIMUM 3/8" RADIUS AT THE JUNCTION OF THE WALL AND FLOOR.
WC-01	WALL COVERING	TOWER WALL COVERINGS	MARQUISE SILK	SILVER T2-MS-13	-	-	-	WWW.TOWERWALLCOVERING.COM	
WC-02	WALL COVERING	TOWER WALL COVERINGS	MARQUISE SILK	GOLDEN BERYL T2-MS-11	-	-	CLASS A	WWW.TOWERWALLCOVERING.COM	

PAINT SCHEDULE

PAINT TAG	PAINT COLOR	PAINT FINISH	PAINT SOURCE	PAINT CONTACT	PAINT NOTES
PNT-01	VINELAND CC-722	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	EXTERIOR
PNT-02	KENDALL CHARCOAL HC-166	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	EXTERIOR
PNT-03	IRON MOUNTAIN 2134-30	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	EXTERIOR
PNT-11	VINELAND CC-722	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	INTERIOR, SAND BRICK FINISH TO REMOVE (E) COATING PRIOR TO PAINTING
PNT-12	TATE OLIVE HC-112	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	INTERIOR
PNT-13	<varies>	<varies>	<varies>	<varies>	<varies>
PNT-14	MIDSUMMER NIGHT 2133-20	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	INTERIOR
PNT-15	KENDALL CHARCOAL HC-166	SATIN	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	INTERIOR
PNT-16	BLACK 2132	FLAT	BENJAMIN MOORE	WWW.BENJAMINMOORE.COM	INTERIOR

EQUIPMENT SCHEDULE

MARK	TYPE	MANUFACTURER	MODEL	DESCRIPTION
EQ-01				
EQ-04				
01 RESTROOM				
EQ-01	TOILET TISSUE DISPENSER	BOBRICK	B-4288	CONTURA SERIES, SURFACE MOUNTED, MULTI-ROLL TOILET TISSUE DISPENSER, SATIN-FINISH STAINLESS STEEL
EQ-02	GRAB BAR	BOBRICK	B-5806.99x42	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-02A	GRAB BAR	BOBRICK	B-5806.99x36	STRAIGHT PEENED GRAB NAR, SURFACE MOUNTED, SATIN-FINISH SLIP RESISTANT STAINLESS STEEL
EQ-03	BABY CHANGING STATION	BOBRICK	KB301-SS	VERTICAL SURFACE MOUNTED STAINLESS STEEL BABY CHANGING STATION
EQ-04	SEAT COVER DISPENSOR	BOBRICK	B-4221	BOBRICK CONTURA SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-05	ROBE HOOK	BOBRICK	B-76717	SURFACE MOUNTED SINGLE ROBE HOOK, SATIN FINISH STAINLESS STEEL
EQ-06	SANITARY NAPKIN DISPOSAL	BOBRICK	B-254	CLASSIC SERIES, SURFACE MOUNTED, SATIN FINISH STAINLESS STEEL
EQ-07	PAPER TOWEL DISPENSER & WASTE BIN	BOBRICK	B-3940	CLASSIC SERIES RECESSED CONVERTIBLE PAPER TOWER DISPENSER AND WASTE RECEPTICAL, STAINLESS STEEL
EQ-08	SOAP DISPENSER	BOBRICK	B-2012	AUTOMATIC WALL-MOUNTED SOAP DISPENSOR, STAINLESS STEEL
EQ-09	TOILET PARTITION	SCRANTON	HINY HIDERS	FLOOR MOUNTED OVERHEAD BRACED TOILEY PARTITIONS, HARDWARE & SHOES, CONTINUOUS HINGE, COLOR: FOSSIL, FINISH: ORANE PEEL
EQ-10	URINIAL PARTITION	SCRANTON	HINY HIDERS	WALL MOUNTED URINAL PARTITIONS, FINISH TO MATCH EQ-09
EQ-11	MIRROR	BOBRICK	B-2908	TEMPERED GLASS MIRROR, 24x36
02 WARMING KITCHEN				
EQ-20	WARMING OVEN	AVANTCO	KMC-F-530-LA	FULL HEIGHT, COMBINATION, FULL LENGTH DOOR, AND UNIVERSAL WIRE, 6" MIN LEGS OR CASTERS
EQ-21	WIRE SHELVING	ADVANCED TABCO	EC-1830	FOUR TIER COMBINATION CHROME WIRE SHELVING, 30"W X 18"D, HEAVY DUTY, CHOME PLATED FINISH, , 6" MIN LEGS
EQ-22	TRASH RECEPTACLE	By Owner	NIKEC	Trash Receptacle, 23 Gallon
EQ-23	REACH-IN REFRIGERATOR	True	TS-49-HC	Refrigerator, Reach-In
EQ-24	WORKTABLE	Advance Tabco	HB-SS-248	WORKTABLE W/ ENCLOSED BASE, HINGED DOORS, 6" MIN LEGS,
EQ-25	PASS-THRU SHELF	Fabricated	Stainless Steel	Pass-Thru Shelf
EQ-26	MICROWAVE	AMANA	RCS10TS	STACKABLE COMMERCIAL MICROWAVE W/ PUSH BUTTON CONTROLS, 120V, 1000W
EQ-27	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Double With Concealed Brackets
EQ-28	WORKTABLE	Advance Tabco	KMSLAG-245-X	STAINLESS STEEL WORK TABLE, 60"W X 24"D, 16 GAUGE W/ 5" H BACKSPASH, ADJUSTABLE UNDERSHELF, STAINLESS STEEL LEGS
EQ-29	WALL SHELF	Fabricated	Stainless Steel	Wall Shelf, Tubular
EQ-30	WALL FLASHING	Fabricated	Stainless Steel	STAINLESS STEEL WALL FLASHING
EQ-31	3-COMPARTMENT SINK	Advance Tabco	93-3-54-18RL	REGALINE SINK, 3-COMPARTMENT, WITH LEFT & RIGHT-HAND DRAINBOARDS, 20" FRONT-TO-BACK X 16"W SINK COMPARTMENTS, 12" DEEP
EQ-32	LOCKERS	By Owner	NIKEC	METAL LOCKERS, TWO TIERS.
EQ-33	HAND SINK	Advance Tabco	7-PS-80	COMBINATION HAND SINK W/ TOWEL AND SOAP DISPENSER - 17 1/4" x 15 1/4", S.P.D.
EQ-34	SINK FAUCET	ADVANCE TABCO	K-105	FAUCET, 8" O.C., SPLASH MOUNTED WITH 14" SWING SPOUT, S.P.D.
EQ-35	PRE-RINSE FAUCET	ADVANCE TABCO	K-116	T&S HEAVY DUTY PRE-RINSE FAUCET, 8" O.C., S.P.D.
03 ASSEMBLY ROOMS				
EQ-50	MOTORIZED WINDOW SHADE	MECHOSHADE	ELECTROSHADE	iQ3-DC WIRELESS MOTOR, FRAME TO TO MATCH STOREFRONT FINISH, FABRIC TO BE SOHO SERIES 1600 3% OPEN BLACK BROWN
04 JANITORIAL				
EQ-36	UTILITY SHELF	BRADLEY	9985	UTILITY SHELF W/ 4 HOOK, 5 HOLDERS, AND 1 DRYING ROD - 42" WIDE

PLAN CHECK# SR0377922

HEALTH DEPARTMENT FINISH SCHEDULE

BUSINESS NAME: CITY OF LAKEWOOD / PALMS PARK COMMUNITY CENTER
JOBSITE ADDRESS: 12305 207TH ST,
CITY: LAKEWOOD ZIP CODE: 90715

	FLOORS	COVED BASE	WALLS	CEILINGS
FOOD PREPARATION • WARMING KITCHEN	QT-01 DALTILE QUARRY TILE, ARID GRAY 0Q42, ABRASIVE, 6"X6"	QT-02 DALTILE QUARRY TILE COVE BASE, ARID GRAY 0Q42, SHAPE Q3565, 5" X 6", 3/8" RADIUS AT JUNCTION OF WALL AND FLOOR.	GYP/PNT-13 BENJAMIN MOORE, TITANIUM 2141-60, SEMI-GLOSS	GYP/PNT-13 BENJAMIN MOORE, TITANIUM 2141-60, SEMI-GLOSS
RESTROOMS • MEN'S 116 • WOMEN'S 115 • UNISET 117	PT-01 DALTILE, PORCELIN TILE, ASH GREY, MATTE, 12" X 24" PT-02 DALTILE, PORCELIN TILE, DOVE GREY, MATTE, 12" X 24"	PT-03 DALTILE, PORCELIN TILE COVE BASE, DOVE GREY, MATTE, SHAPE Q3565, 5" X 6"	CT-01 DALTILE, CERAMIC TILE, COLOR WHEEL LINEAR, DESERT GREY, GLOSS, 8"X24" CT-02 DALTILE, CERAMIC TILE, COLOR WHEEL LINEAR, SEA BREEZE, GLOSS, 8"X24" CT-03 DALTILE, CERAMIC TILE, COLOR WHEEL LINEAR, SUEDE GREY, GLOSS, 8"X24"	GYP/PNT-13 BENJAMIN MOORE, TITANIUM 2141-60, SEMI-GLOSS
JANITORIAL • JANITOR 109	CONC-01 CONCRETE SEALER, EUCLID CHEMICAL, ULTRASIL LI+, CLEAR	CT-04 DAL TILE, CERAMIC TILE, SANITARY COVE BASE, SHAPE S-3619TN, DESERT GREY X114, 6" X 6", 3/8" RADIUS AT JUNCTION OF WALL AND FLOOR.	GYP/PNT-13 BENJAMIN MOORE, TITANIUM 2141-60, SEMI-GLOSS	GYP/PNT-13 BENJAMIN MOORE, TITANIUM 2141-60, SEMI-GLOSS

GENERAL FINISH NOTES

1. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D.
2. FOR FINISHES RELATED TO FIXTURES S.M.D., S.P.D. & S.E.D.
3. NOTED FINISH CLASS RATINGS PER CBC CHAPTER 8 PROVIDED BY MANUFACTURER / AMERICAN WOOD COUNCIL. FLOORING MATERIALS RATED PER ASTM-E648 AND WALL/CEILING MATERIALS RATED PER ASTM-E84.
4. ALL INTERIOR WALL AND CEILING FINISHES SHALL BE **CLASS C** MATERIALS PER CBC TABLE 803.9 (SEE NOTE b). WOOD PRODUCTS THAT DO NOT MEET THIS CRITERIA ARE TO BE FINISHED WITH UNIVERSAL FIRE-SHIELD FIRE & FLAME RETARDANT PAINT & STAIN ADDITIVE OR EQUAL TO ACHIEVE THE CLASS C MINIMUM DESIGNATION.
5. PAINT ALL EXPOSED MATERIAL SURFACES
6. PAINT ALL EXPOSED GYP BOARD.
7. ALL GUTTERS SHALL BE FINISHED TO MATCH ADJACENT ROOF AND ALL DOWNSPOUTS SHALL BE FINISHED TO MATCH ADJACENT WALL SURFACE, U.O.N.
8. FOR ALL DOORS, WINDOWS AND STOREFRONT SYSTEMS AND TYPES SEE PLANS AND A700 SERIES SHEETS
9. PROVIDE COVED TILE BASE AT ALL RESTROOMS, SHOWERS, LAVATORIES, AND CHANGING ROOMS
10. ALL TILE WAINSCOT TO GO AROUND BATH ACCESSORY RECESSES
11. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT.
12. CURTAIN, DRAPERIES, FABRIC HANGINGS AND SIMILAR COMBUSTIBLE DECORATIVE MATERIALS SUSPENDED FROM WALLS OR CEILINGS SHALL COMPLY WITH FIRE CODE SECTION 807 AND MEET THE FLAME PROPAGATION PERFORMANCE CRITERIA OF NFPA 701.

MATERIAL SYMBOLS

MTL-01 MATERIAL TYPE - SEE MATERIAL SCHEDULE ON SHEET A7-31

PROJECT NORTH

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

FINISH, EQUIPMENT, AND FINISH SCHEDULE

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A7-31

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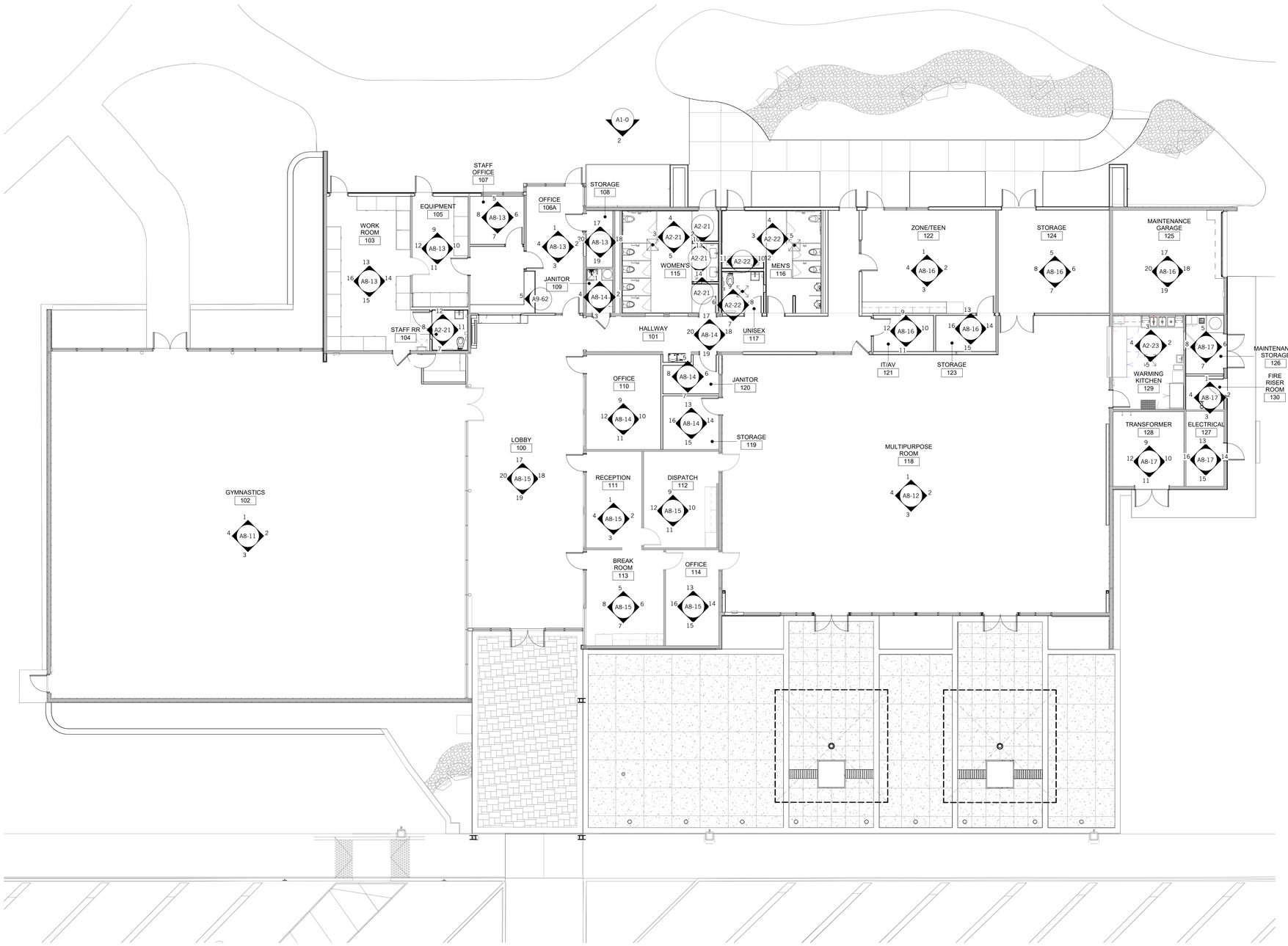

1 INTERIOR ELEVATION KEY PLAN - 1ST FLOOR
1/8" = 1'-0"

INTERIOR ELEVATION NOTES

1. FOR ADDITIONAL INFORMATION, SEE PLANS.
2. FOR MATERIAL INFORMATION, SEE A7-31
3. FOR TYP. MOUNTING HEIGHTS OF TOILET ROOM ACCESSORIES, SEE G1-00 SERIES SHEETS
4. FOR ALL SOFFIT HEIGHTS AND LOCATIONS, REF. A2-00 AND A3-00 SERIES SHEETS
5. FOR PLUMBING FIXTURES, S.P.D. AND A7-31 PLUMBING SCHEDULE
6. FOR KITCHEN EQUIPMENT, REFER TO A7-31 EQUIPMENT SCHEDULE
7. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D.
8. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N. AND WALL BASE TO BE WB-01, U.O.N.
9. FOR FINISHES RELATED TO FIXTURES S.M.D., S.P.D. & S.E.D
10. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.

SCALE: 1/8" = 1'-0"

PROJECT NORTH

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CHECK	**Checker**

ELEVATION KEY PLAN

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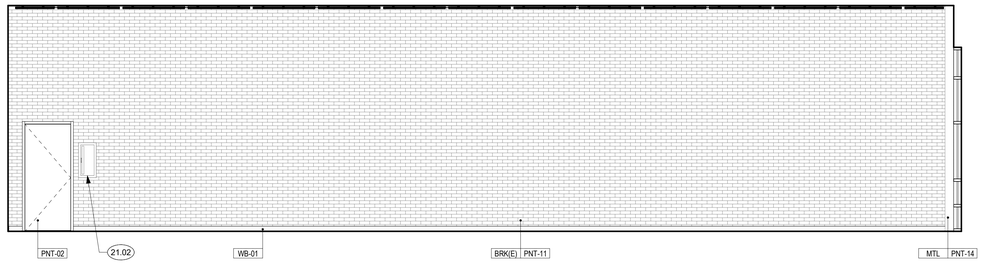
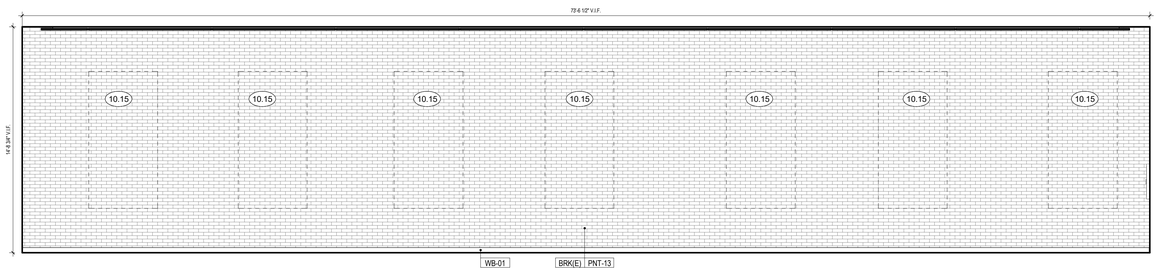
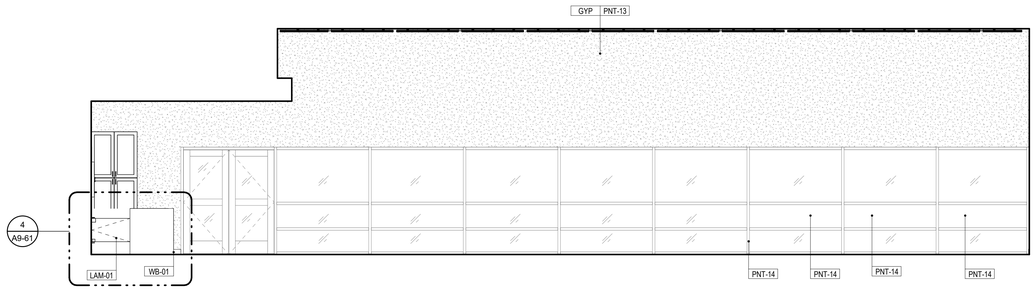


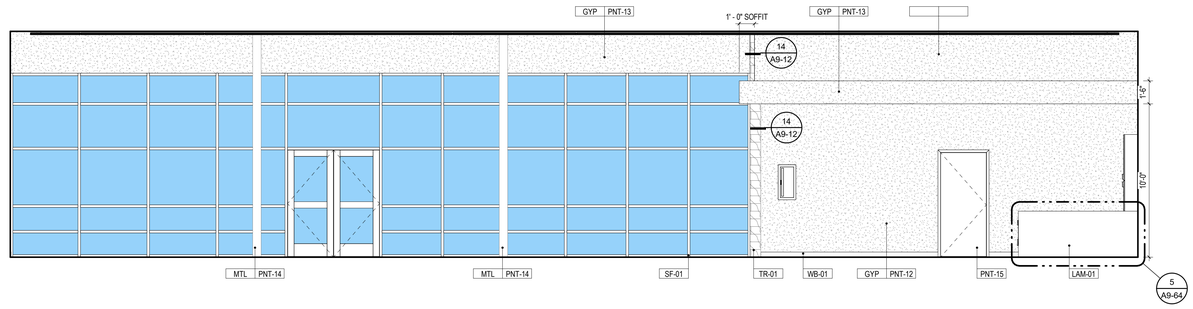
4 GYMNASTICS - ROOM 102 - WEST
1/4" = 1'-0"



3 GYMNASTICS - ROOM 102 - SOUTH
1/4" = 1'-0"



2 GYMNASTICS - ROOM 102 - EAST
1/4" = 1'-0"



1 GYMNASTICS - ROOM 102 - NORTH
1/4" = 1'-0"

INTERIOR ELEVATION NOTES

1. FOR ADDITIONAL INFORMATION, SEE PLANS.
2. FOR MATERIAL INFORMATION, SEE A7-31
3. FOR TYP. MOUNTING HEIGHTS OF TOILET ROOM ACCESSORIES, SEE G1-00 SERIES SHEETS
4. FOR ALL SOFFIT HEIGHTS AND LOCATIONS, REF. A2-00 AND A3-00 SERIES SHEETS
5. FOR PLUMBING FIXTURES, S.P.D. AND A7-31 PLUMBING SCHEDULE
6. FOR KITCHEN EQUIPMENT, REFER TO A7-31 EQUIPMENT SCHEDULE
7. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D.
8. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N. AND WALL BASE TO BE WB-01, U.O.N.
9. FOR FINISHES RELATED TO FIXTURES S.M.D., S.P.D. & S.E.D
10. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.

KEYNOTE LEGEND

10.15 PIN MOUNTED ACRYLIC PANEL ART, REFER TO GRAPHICS PACKAGE.
21.02 SURFACE MOUTNED FIRE EXTINGUISHER CABINET

SCALE: 1/4" = 1'-0"

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PW-23-01

BID SET 06.03.25

X REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

INTERIOR ELEVATIONS - GYM

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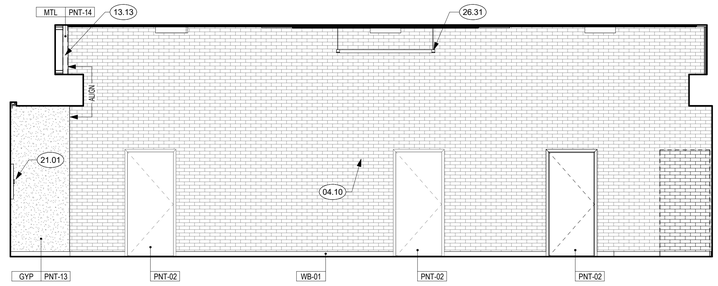
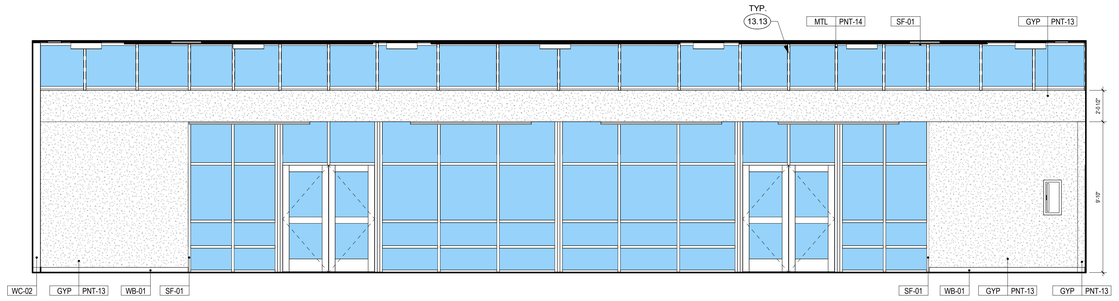
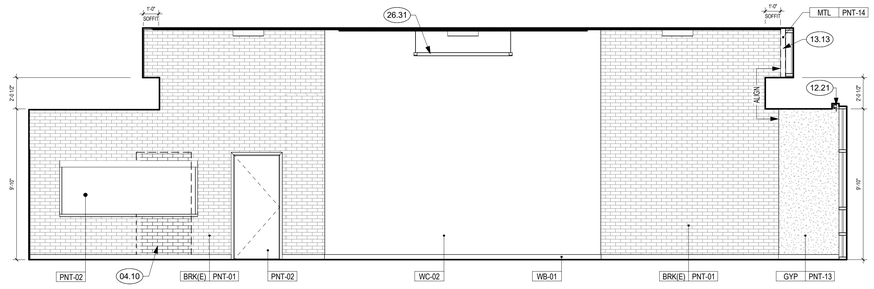


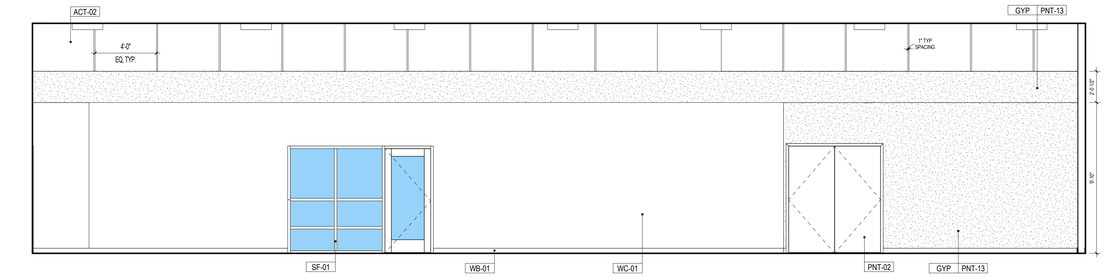
4 ASSEMBLY - ROOM 118 - WEST
1/4" = 1'-0"



3 ASSEMBLY - ROOM 118 - SOUTH
1/4" = 1'-0"



2 ASSEMBLY - ROOM 118 - EAST
1/4" = 1'-0"



1 ASSEMBLY - ROOM 118 - NORTH
1/4" = 1'-0"

INTERIOR ELEVATION NOTES

1. FOR ADDITIONAL INFORMATION, SEE PLANS.
2. FOR MATERIAL INFORMATION, SEE A7-31
3. FOR TYP. MOUNTING HEIGHTS OF TOILET ROOM ACCESSORIES, SEE G1-00 SERIES SHEETS
4. FOR ALL SOFFIT HEIGHTS AND LOCATIONS, REF. A2-00 AND A3-00 SERIES SHEETS
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6. FOR KITCHEN EQUIPMENT, REFER TO A7-31 EQUIPMENT SCHEDULE
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8. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N. AND WALL BASE TO BE WB-01, U.O.N.
9. FOR FINISHES RELATED TO FIXTURES S.M.D., S.P.D. & S.E.D
10. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.

KEYNOTE LEGEND

04.10	BRICK VENEER INFILL TO ALIGN TO ADJACENT SURFACES. PREPARE BRICK FOR PAINTED FINISH.
12.21	SURFACE MOUNTED MOTORIZED ROLLER SHADES IN PRE-MANUFACTURED ROLLER SHADE POCKET.
13.13	(E) STEEL COLUMN TO REMAIN
21.01	SEMI-RECESSED FIRE EXTINGUISHER CABINET
26.31	SUSPENDED LIGHT FIXTURES, S.E.D.

SCALE: 1/4" = 1'-0"

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CLIENT

CONSULTANT

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12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

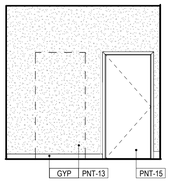
SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

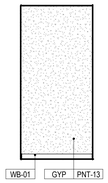
INTERIOR ELEVATIONS - EVENT ROOM

SHEET
A8-12

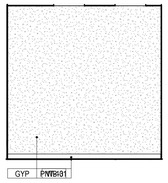
6/26/2025 4:42:01 PM



20 STORAGE - ROOM 108 - WEST
1/4" = 1'-0"

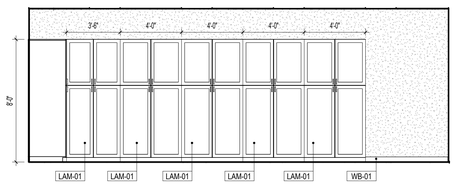


19 STORAGE - ROOM 108 - SOUTH
1/4" = 1'-0"

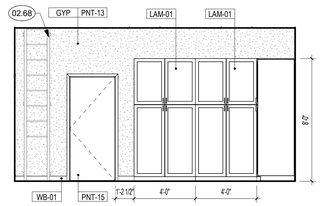


18 STORAGE - ROOM 108 - EAST
1/4" = 1'-0"

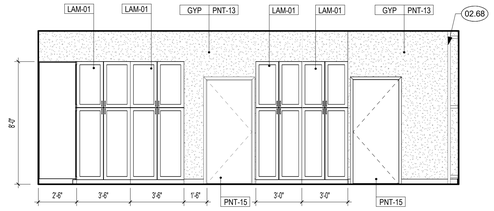
17 STORAGE - ROOM 108 - NORTH
1/4" = 1'-0"



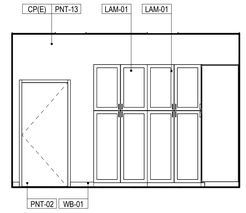
16 WORK ROOM - ROOM 103 - WEST
1/4" = 1'-0"



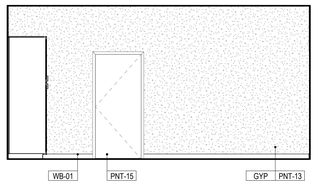
15 WORK ROOM - ROOM 103 - SOUTH
1/4" = 1'-0"



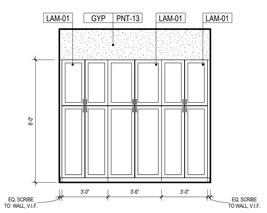
14 WORK ROOM - ROOM 103 - EAST
1/4" = 1'-0"



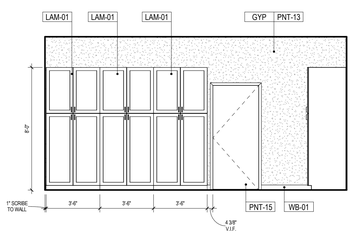
13 WORK ROOM - ROOM 103 - NORTH
1/4" = 1'-0"



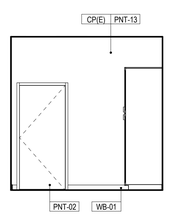
12 EQUIPMENT - ROOM 105 - WEST
1/4" = 1'-0"



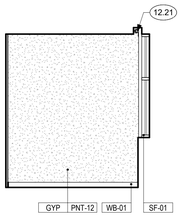
11 EQUIPMENT - ROOM 105 - SOUTH
1/4" = 1'-0"



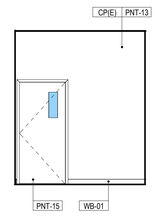
10 EQUIPMENT- ROOM 105 - EAST
1/4" = 1'-0"



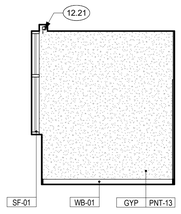
9 EQUIPMENT - ROOM 105 - NORTH
1/4" = 1'-0"



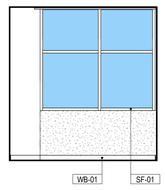
8 STAFF OFFICE - ROOM 107 - WEST
1/4" = 1'-0"



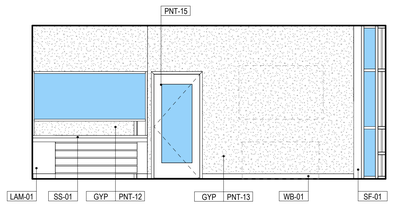
7 STAFF OFFICE - ROOM 107 - SOUTH
1/4" = 1'-0"



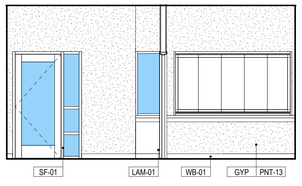
6 STAFF OFFICE - ROOM 107 - EAST
1/4" = 1'-0"



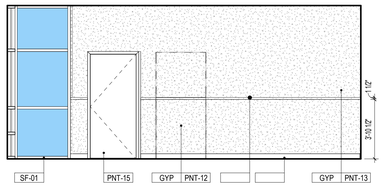
5 STAFF OFFICE - ROOM 107 - NORTH
1/4" = 1'-0"



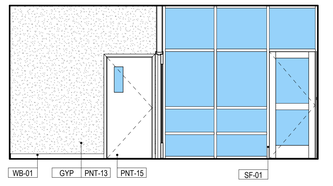
4 OFFICE - ROOM 106 - WEST
1/4" = 1'-0"



3 OFFICE - ROOM 106 - SOUTH
1/4" = 1'-0"



2 OFFICE - ROOM 106 - EAST
1/4" = 1'-0"



1 OFFICE - ROOM 106 - NORTH
1/4" = 1'-0"

SCALE: 1/4" = 1'-0"

INTERIOR ELEVATION NOTES

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KEYNOTE LEGEND

02.68 PROTECT IN PLACE (E) LADDER TO REMAIN.
12.21 SURFACE MOUNTED MOTORIZED ROLLER SHADES IN PRE-MANUFACTURED ROLLER SHADE POCKET.

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PW-23-01

BID SET 06.03.25

REVISIONS

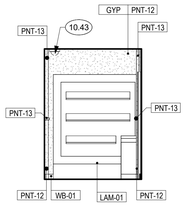
SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

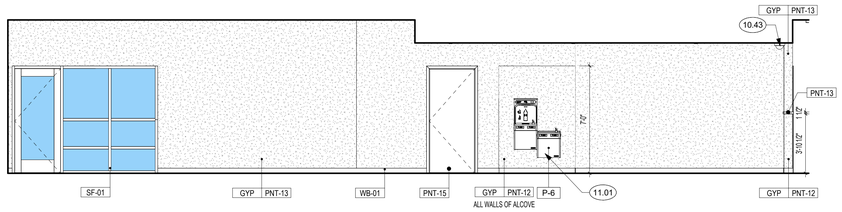
INTERIOR ELEVATIONS - BOH

SHEET
A8-13

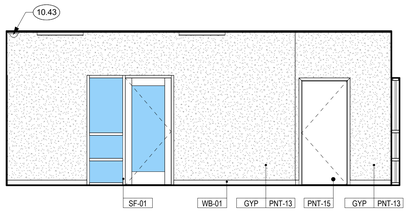
6/26/2025 4:42:08 PM



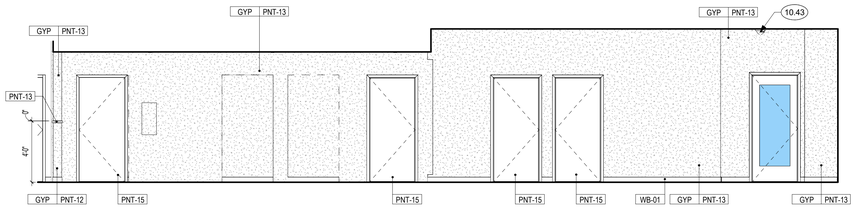
20 HALLWAY - ROOM 101 - WEST
1/4" = 1'-0"



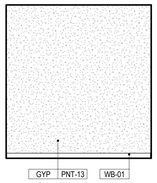
19 HALLWAY - ROOM 101 - SOUTH
1/4" = 1'-0"



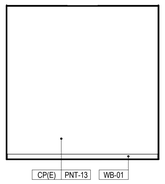
18 HALLWAY - ROOM 101 - EAST
1/4" = 1'-0"



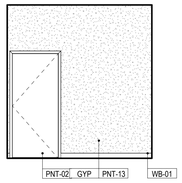
17 HALLWAY - ROOM 101 - NORTH
1/4" = 1'-0"



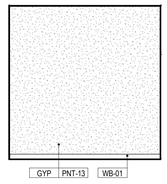
16 STORAGE - ROOM 119 - WEST
1/4" = 1'-0"



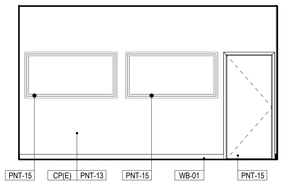
15 STORAGE - ROOM 119 - SOUTH
1/4" = 1'-0"



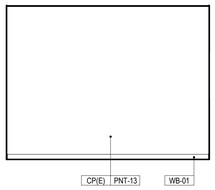
14 STORAGE - ROOM 119 - EAST
1/4" = 1'-0"



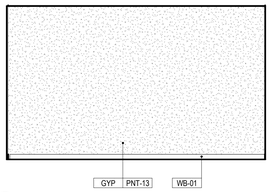
13 STORAGE - ROOM 119 - NORTH
1/4" = 1'-0"



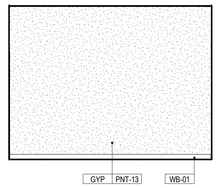
12 OFFICE - ROOM 110 - WEST
1/4" = 1'-0"



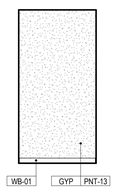
11 OFFICE - ROOM 110 - SOUTH
1/4" = 1'-0"



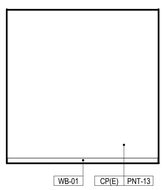
10 OFFICE - ROOM 110 - EAST
1/4" = 1'-0"



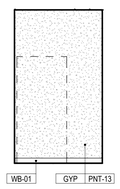
9 OFFICE - ROOM 110 - NORTH
1/4" = 1'-0"



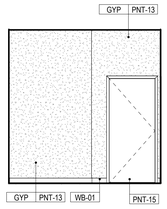
8 JANITOR - ROOM 120 - WEST
1/4" = 1'-0"



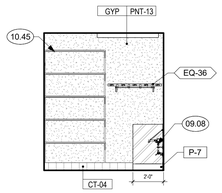
7 JANITOR - ROOM 120 - SOUTH
1/4" = 1'-0"



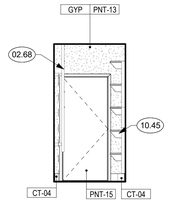
6 JANITOR - ROOM 120 - EAST
1/4" = 1'-0"



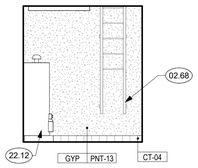
5 JANITOR - ROOM 120 - NORTH
1/4" = 1'-0"



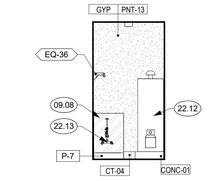
4 JANITOR - ROOM 109 - WEST
1/4" = 1'-0"



3 JANITOR - ROOM 109 - SOUTH
1/4" = 1'-0"



2 JANITOR - ROOM 109 - EAST
1/4" = 1'-0"



1 JANITOR - ROOM 109 - NORTH
1/4" = 1'-0"

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10. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED.
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.

KEYNOTE LEGEND

02.68	PROTECT IN PLACE (E) LADDER TO REMAIN.
09.08	SURFACE MOUTNED MOP SINK SPLASH GUARD PANELS, TWO WALLS, NO EXPOSED FASTENERS, 12" MIN ABOVE MOP SINK.
10.43	CEILING MOUNTED SECURITY CAMERA, S.E.D. FOR CONDUIT ROUTING AND SPECIFICATION, VERIFY FINAL LOCATION AND DIRECTION WITH THE CITY.
10.45	WALL MOUNTED HEAVY DUTY SHELVING, STAINLESS STEEL WIRE SHELVES, ADJUSTABLE
11.01	HI-LOW DRINKING FOUNTAIN WITH BOTTLE FILLER. INSTALL PER NOTE 25 AND DETAIL 11/G1-42
22.12	TANK WATER HEATER ON 6" CONCRETE CURB, S.P.D.
22.13	SERVICE SINK FAUCET, ANTI-SIPHON PRESSURE TYPE VACUUM BREAKER, S.P.D.

SCALE: 1/4" = 1'-0"

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505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

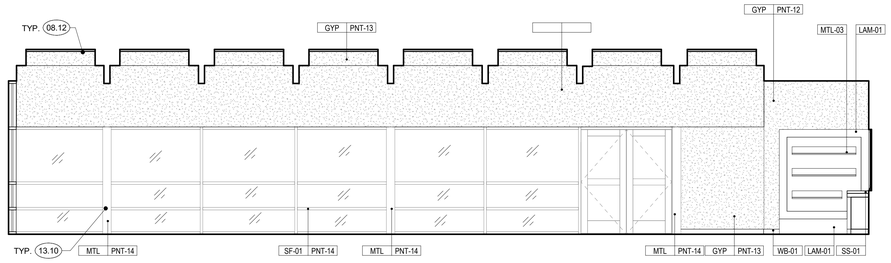
SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

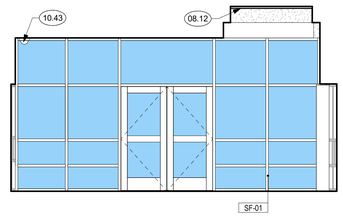
INTERIOR ELEVATIONS

SHEET
A8-14

6/26/2025 4:42:14 PM



20 LOBBY - ROOM 100 - WEST
1/4" = 1'-0"



19 LOBBY - ROOM 100 - SOUTH
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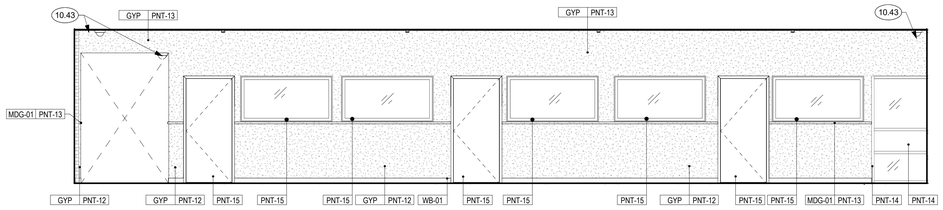

18 LOBBY - ROOM 100 - EAST
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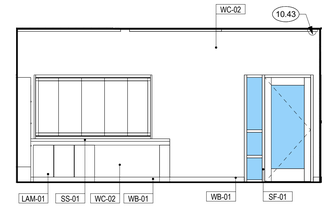

17 LOBBY - ROOM 100 - NORTH
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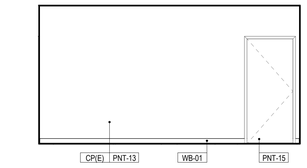

16 OFFICE - ROOM 114 - WEST
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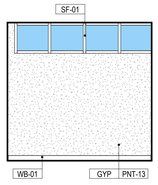
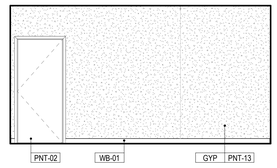
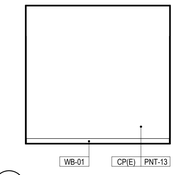


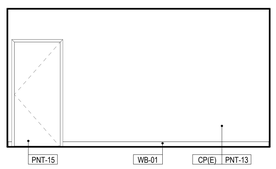
15 OFFICE - ROOM 114 - SOUTH
1/4" = 1'-0"



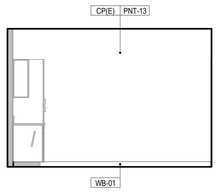
14 OFFICE - ROOM 114 - EAST
1/4" = 1'-0"



13 OFFICE - ROOM 114 - NORTH
1/4" = 1'-0"



12 DISPATCH - ROOM 112 - WEST
1/4" = 1'-0"



11 DISPATCH - ROOM 112 - SOUTH
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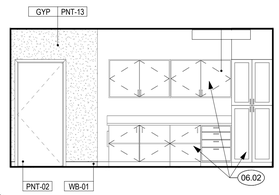
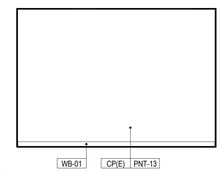
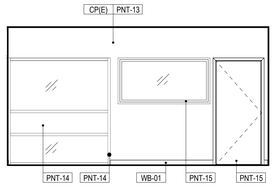


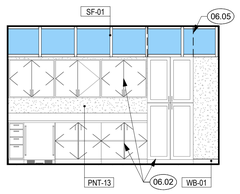
10 DISPATCH - ROOM 112 - EAST
1/4" = 1'-0"



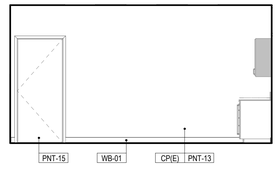
9 DISPATCH - ROOM 112 - NORTH
1/4" = 1'-0"



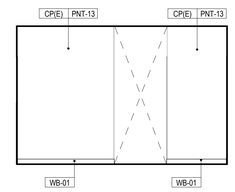
8 BREAK ROOM - ROOM 113 - WEST
1/4" = 1'-0"



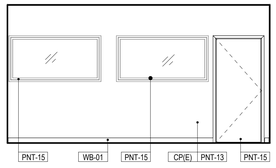
7 BREAK ROOM - ROOM 113 - SOUTH
1/4" = 1'-0"



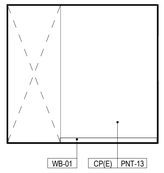
6 BREAK ROOM - ROOM 113 - EAST
1/4" = 1'-0"



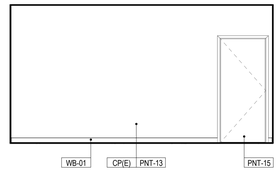
5 BREAK ROOM - ROOM 113 - NORTH
1/4" = 1'-0"



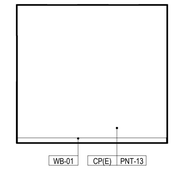
4 RECEPTION - ROOM 111 - WEST
1/4" = 1'-0"



3 RECEPTION - ROOM 111 - SOUTH
1/4" = 1'-0"



2 RECEPTION - ROOM 111 - EAST
1/4" = 1'-0"



1 RECEPTION - ROOM 111 - NORTH
1/4" = 1'-0"

INTERIOR ELEVATION NOTES

1. FOR ADDITIONAL INFORMATION, SEE PLANS.
2. FOR MATERIAL INFORMATION, SEE A7-31
3. FOR TYP. MOUNTING HEIGHTS OF TOILET ROOM ACCESSORIES, SEE G1-00 SERIES SHEETS
4. FOR ALL SOFFIT HEIGHTS AND LOCATIONS, REF. A2-00 AND A3-00 SERIES SHEETS
5. FOR PLUMBING FIXTURES, S.P.D. AND A7-31 PLUMBING SCHEDULE
6. FOR KITCHEN EQUIPMENT, REFER TO A7-31 EQUIPMENT SCHEDULE
7. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D.
8. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N. AND WALL BASE TO BE WB-01, U.O.N.
9. FOR FINISHES RELATED TO FIXTURES S.M.D., S.P.D. & S.E.D
10. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.

KEYNOTE LEGEND

06.02 PROTECT (E) CASEWORK TO REMAIN DURING CONSTRUCTION
06.05 REMOVE (E) CASEWORK ENCLOSURE
08.12 ARTIFICIAL SKYLIGHT, SEE RCP AND S.E.D. FOR ADDITIONAL INFORMATION.
10.43 CEILING MOUNTED SECURITY CAMERA, S.E.D. FOR CONDUIT ROUTING AND SPECIFICATION, VERIFY FINAL LOCATION AND DIRECTION WITH THE CITY.
13.10 PROTECT (E) INTUMESCENT PAINTED COLUMN DURING CONSTRUCTION

SCALE: 1/4" = 1'-0"

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12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

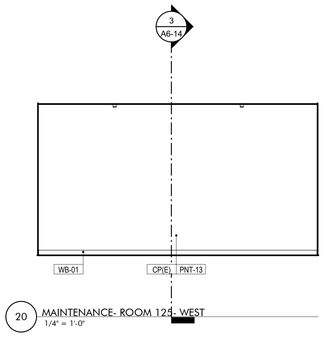
SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

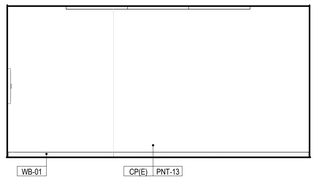
INTERIOR ELEVATIONS

SHEET
A8-15

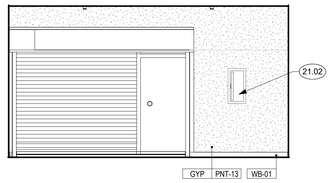
6/26/2025 4:42:20 PM



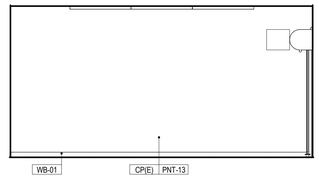
20 MAINTENANCE- ROOM 125- WEST
1/4" = 1'-0"



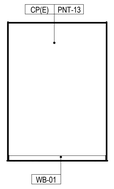
19 MAINTENANCE- ROOM 125- SOUTH
1/4" = 1'-0"



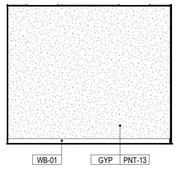
18 MAINTENANCE- ROOM 125- EAST
1/4" = 1'-0"



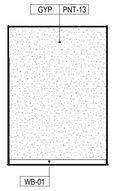
17 MAINTENANCE- ROOM 125- NORTH
1/4" = 1'-0"



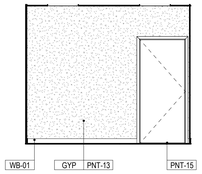
16 STORAGE - ROOM 123 - WEST
1/4" = 1'-0"



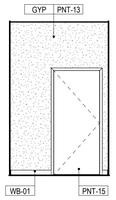
15 STORAGE - ROOM 123 - SOUTH
1/4" = 1'-0"



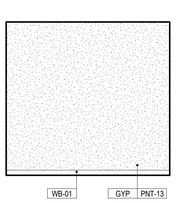
14 STORAGE - ROOM 123 - EAST
1/4" = 1'-0"



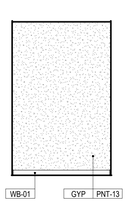
13 STORAGE - ROOM 123- NORTH
1/4" = 1'-0"



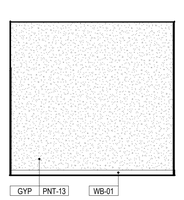
12 IT /AV - ROOM 121 - WEST
1/4" = 1'-0"



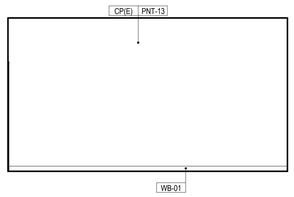
11 IT/ AV - ROOM 121 - SOUTH
1/4" = 1'-0"



10 IT/ AV - ROOM 121 - EAST
1/4" = 1'-0"



9 IT / AV - ROOM 121 - NORTH
1/4" = 1'-0"



8 STORAGE- ROOM 124 - WEST
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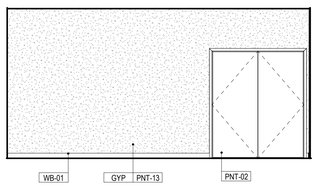
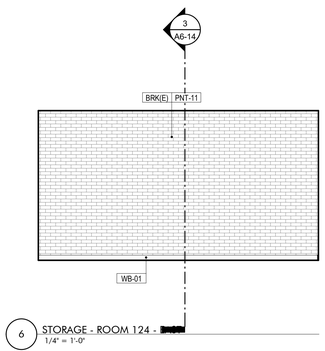
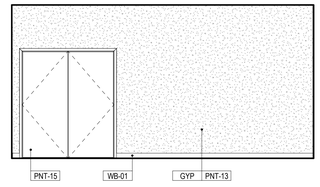


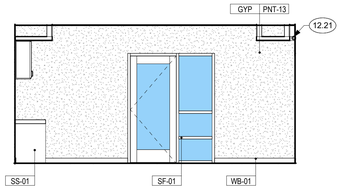
7 STORAGE - ROOM 124 - SOUTH
1/4" = 1'-0"



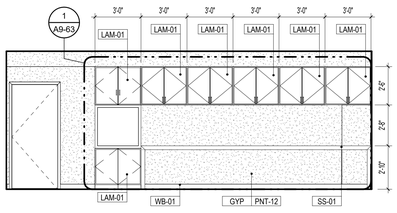
6 STORAGE - ROOM 124 - [redacted]
1/4" = 1'-0"



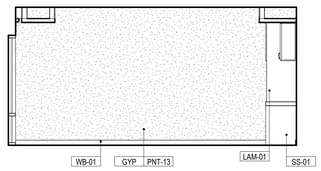
5 STORAGE- ROOM 124 - NORTH
1/4" = 1'-0"



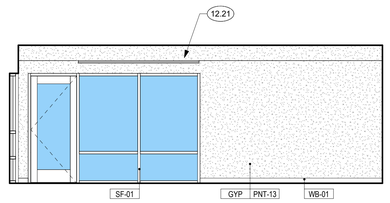
4 ZONE/TEEN - ROOM 122 - WEST
1/4" = 1'-0"



3 ZONE/TEEN - ROOM 122 - SOUTH
1/4" = 1'-0"



2 ZONE/TEEN - ROOM 122 - EAST
1/4" = 1'-0"



1 ZONE/TEEN - ROOM 122 - NORTH
1/4" = 1'-0"

SCALE: 1/4" = 1'-0"

INTERIOR ELEVATION NOTES

1. FOR ADDITIONAL INFORMATION, SEE PLANS.
2. FOR MATERIAL INFORMATION, SEE A7-31
3. FOR TYP. MOUNTING HEIGHTS OF TOILET ROOM ACCESSORIES, SEE G1-00 SERIES SHEETS
4. FOR ALL SOFFIT HEIGHTS AND LOCATIONS, REF. A2-00 AND A3-00 SERIES SHEETS
5. FOR PLUMBING FIXTURES, S.P.D. AND A7-31 PLUMBING SCHEDULE
6. FOR KITCHEN EQUIPMENT, REFER TO A7-31 EQUIPMENT SCHEDULE
7. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D.
8. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N. AND WALL BASE TO BE WB-01, U.O.N.
9. FOR FINISHES RELATED TO FIXTURES S.M.D., S.P.D. & S.E.D
10. ALL GYPSUM BOARD WALLS AND SOFFITS TO BE FINISHED AS FOLLOWS:
    LEVEL 2: WHERE PANELS FORM SUBSTRATES FOR CERAMIC TILE/FRP AND WHERE INDICATED
    LEVEL 3: FOR ALL EXPOSED GYPSUM BOARD SURFACES RECEIVING TEXTURE AND PAINT, EXCEPT AT UPGRADED FINISH AT OFFICE/LOBBY AREAS.
    LEVEL 4: FOR GYPSUM BOARD SURFACES RECEIVING WALL COVERINGS.

KEYNOTE LEGEND

12.21 SURFACE MOUNTED MOTORIZED ROLLER SHADES IN PRE-MANUFACTURED ROLLER SHADE POCKET.
21.02 SURFACE MOUTNED FIRE EXTINGUISHER CABINET

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

INTERIOR ELEVATIONS

SHEET
A8-16

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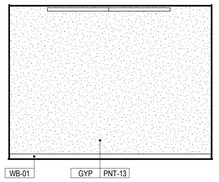
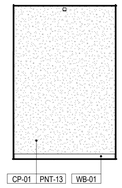


16 ELECTRICAL- ROOM 127- WEST
1/4" = 1'-0"



15 ELECTRICAL- ROOM 127- SOUTH
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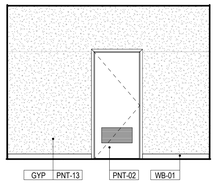
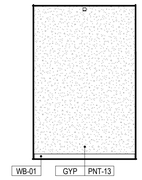
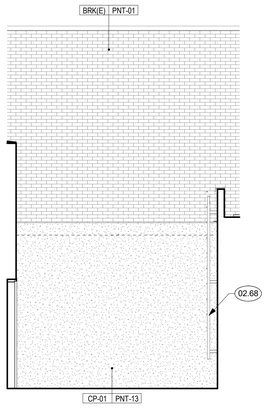


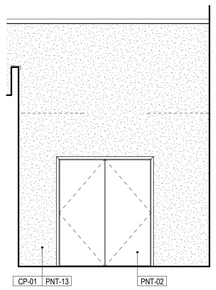
14 ELECTRICAL- ROOM 127- EAST
1/4" = 1'-0"



13 ELECTRICAL- ROOM 127- NORTH
1/4" = 1'-0"



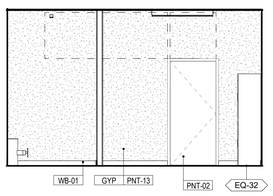
12 TRANSFORMER- ROOM 128- WEST
1/4" = 1'-0"



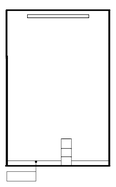
11 TRANSFORMER- ROOM 128- SOUTH
1/4" = 1'-0"

10 TRANSFORMER- ROOM 128- EAST
1/4" = 1'-0"

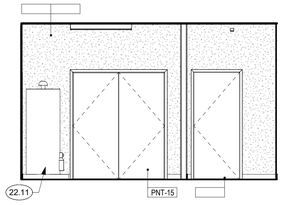
9 TRANSFORMER- ROOM 128- NORTH
1/4" = 1'-0"



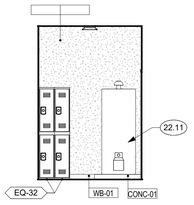
8 SERVICE- ROOM 126- WEST
1/4" = 1'-0"



7 SERVICE- ROOM 126- SOUTH
1/4" = 1'-0"



6 SERVICE- ROOM 126- EAST
1/4" = 1'-0"



5 SERVICE- ROOM 126- NORTH
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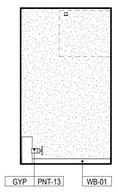
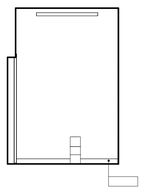


4 FIRE RISER - ROOM 130 - WEST
1/4" = 1'-0"



3 FIRE RISER - ROOM 130 - SOUTH
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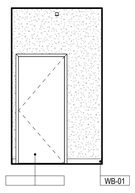
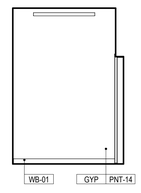


2 FIRE RISER - ROOM 130 - EAST
1/4" = 1'-0"



1 FIRE RISER - ROOM 130 - NORTH
1/4" = 1'-0"

7

INTERIOR ELEVATION NOTES

1. FOR ADDITIONAL INFORMATION, SEE PLANS.
2. FOR MATERIAL INFORMATION, SEE A7-31
3. FOR TYP. MOUNTING HEIGHTS OF TOILET ROOM ACCESSORIES, SEE G1-00 SERIES SHEETS
4. FOR ALL SOFFIT HEIGHTS AND LOCATIONS, REF. A2-00 AND A3-00 SERIES SHEETS
5. FOR PLUMBING FIXTURES, S.P.D. AND A7-31 PLUMBING SCHEDULE
6. FOR KITCHEN EQUIPMENT, REFER TO A7-31 EQUIPMENT SCHEDULE
7. FOR FINISHES RELATED TO HARDSCAPE AND SITE ACCESSORIES S.L.D.
8. ALL INTERIOR WALL TO BE PAINTED PNT-13, U.O.N. AND WALL BASE TO BE WB-01, U.O.N.
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KEYNOTE LEGEND

02.68	PROTECT IN PLACE (E) LADDER TO REMAIN.
05.14	INSTALL NEW SCUPPER AT (E) SCUPPER LOCATION, S.P.D.
22.11	TANK WATER HEATER ON 4" CONCRETE CURB, SERVING WARMING KITCHEN, S.P.D.
26.30	EXTERIOR WALL MOUNTED LIGHTING FIXTURE, S.E.D.

SCALE: 1/4" = 1'-0"

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DRAWN **Author**
CHECK **Checker**

INTERIOR ELEVATIONS

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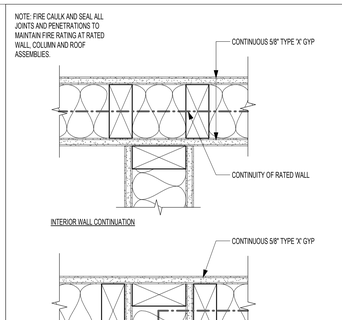
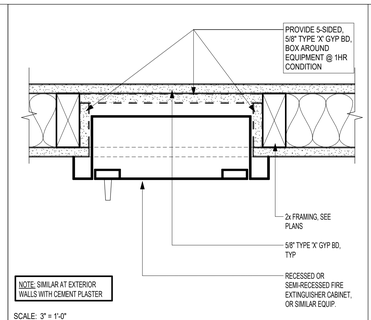
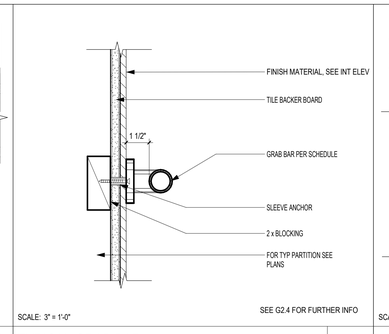


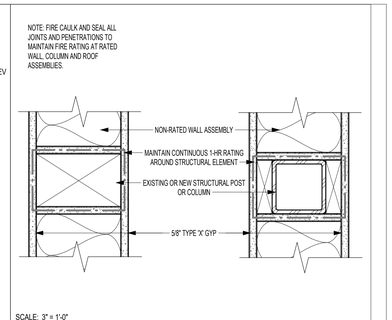
1 HR CONTINUITY PLAN CONFIGURATIONS 19



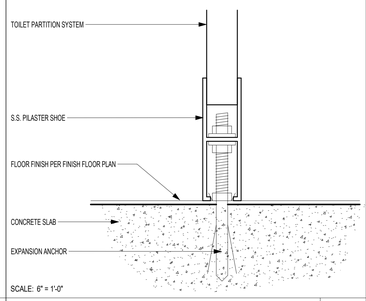
TYPICAL RECESSED EQUIP @ WALL 15



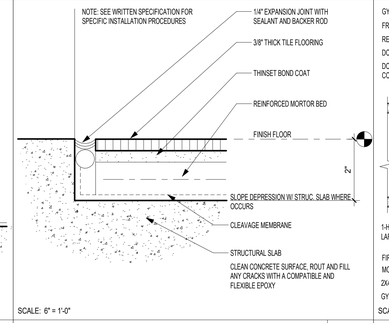
TYPICAL GRAB BAR 10



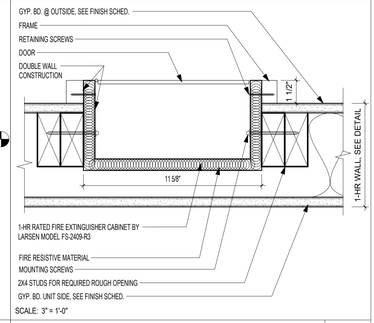
1HR COLUMN IN NON-RATED WALL 5



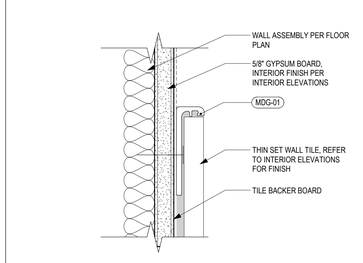
TOILET PARTITION AT FLOOR 14



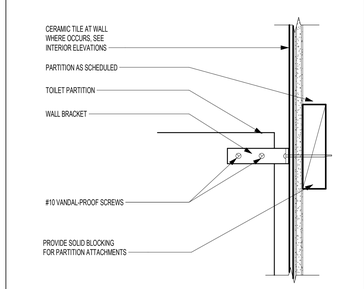
TILE FLOOR 9



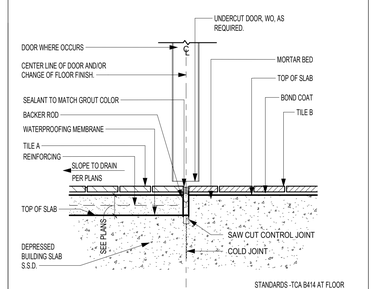
SEMI-RECESSED FIRE EXTINGUISHER CABINET 4



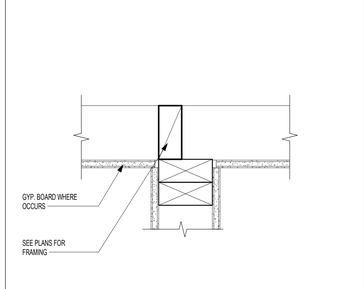
TILE END PIECE 18



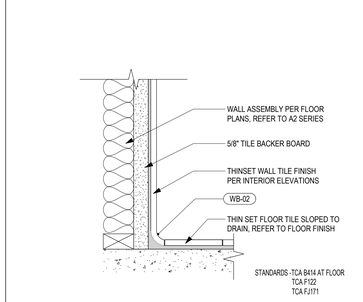
PARTITION AT WALL 13



TILE-THINSET TO TILE-MORTER BED 8

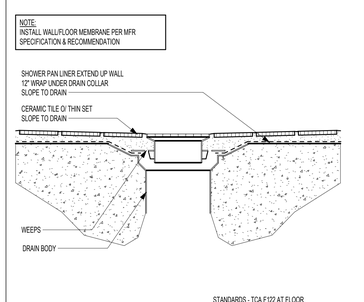


INTERIOR WALL AT CEILING 3

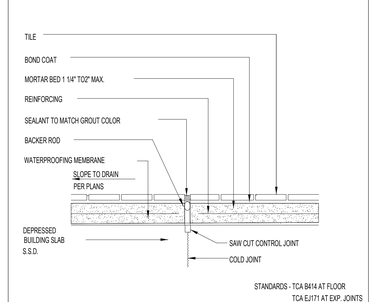


TILE END PIECE 22

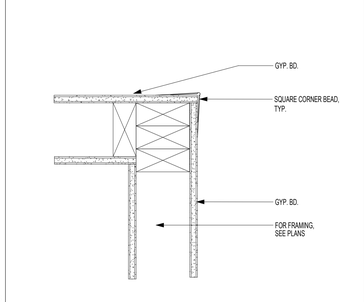
COVE BASE 17



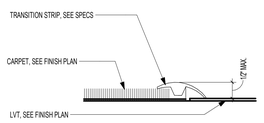
FLOOR DRAIN THIN SET 12



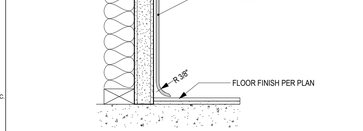
TYP. TILE FLOOR AT EXPANSION JOINT 7



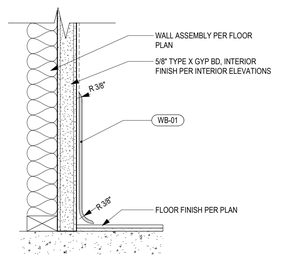
GYPSUM BOARD CORNER 2



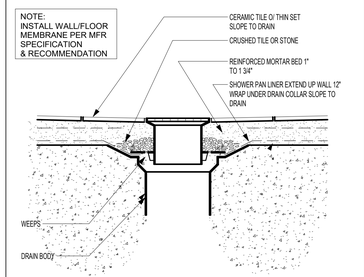
CARPET TO VINYL TRANSITION 20



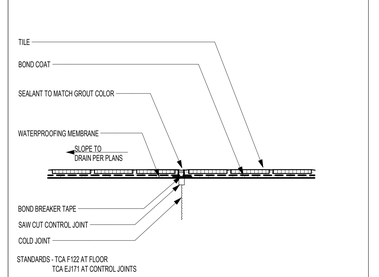
OUTLET IN SOUND/ FIRE WALL 21



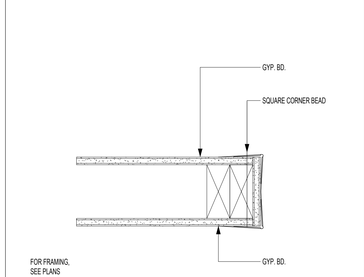
OVERALL BASE 16



INT. FLOOR DRAIN 11



CONTROL JOINT AT TILE FLOOR 6



GYPSUM BOARD FRAMED OPENING 1

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

DETAILS - INTERIOR

SHEET
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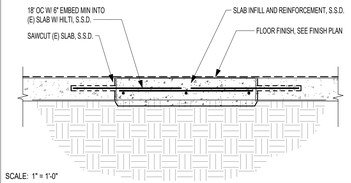
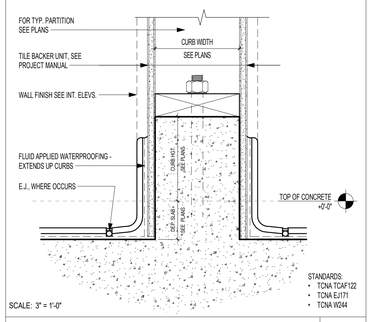


SCALE: 1" = 1'-0"

INFILL SLAB ON GRADE AT TRENCH | 5



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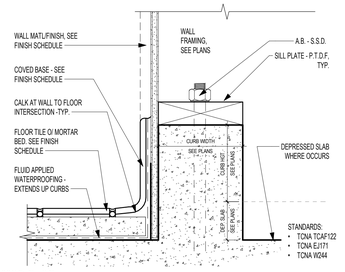
INT. CURB AT DEPRESSED SLAB BOTH SIDES | 4



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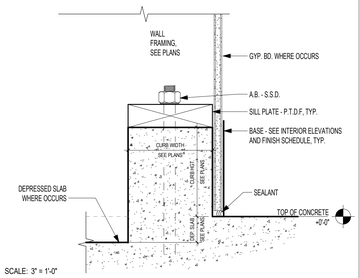
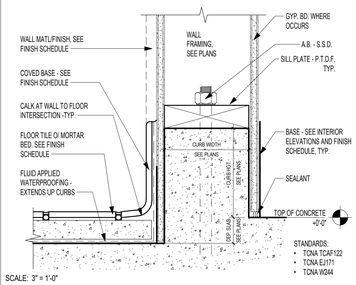
INT. CURB AT PLUMBING WALL WITH TILE | 3



SCALE: 3" = 1'-0"

INT. CURB AT PLUMBING WALL WITH GYP. | 2



SCALE: 3" = 1'-0"

INT. CURB AT DEPRESSED SLAB | 1

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DRAWN **Author**
CHECK **Checker**

DETAILS - INTERIOR WALL BASE

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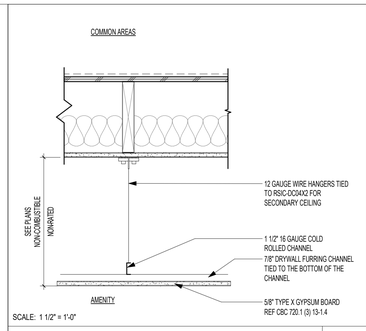
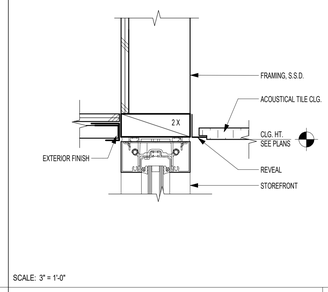


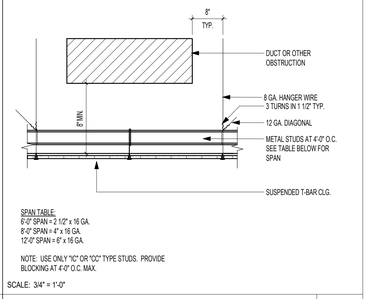
SCALE: 1 1/2" = 1'-0"

DROPPED G.B. CEILING 15



SCALE: 3" = 1'-0"

A.C.T CEILING AT STOREFRONT 10



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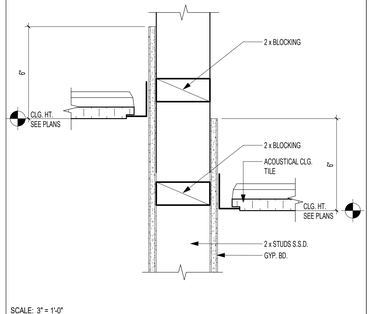
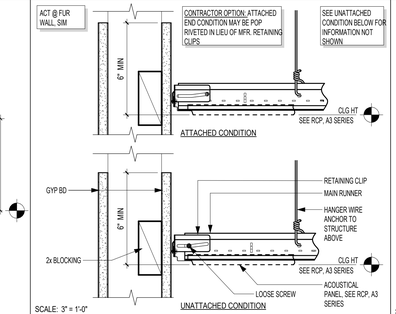
A.T. FRAMING OBSTRUCTION 5



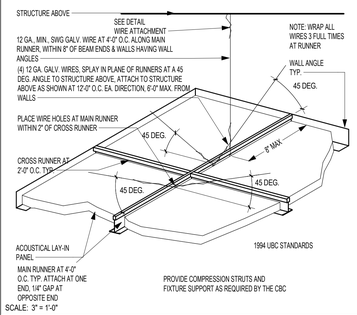
SCALE: 3" = 1'-0"

GYP. BD. STEP AT ACOUSTIC TILE 14



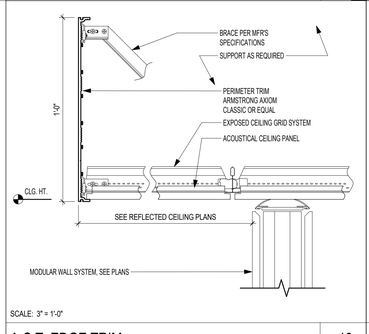
SCALE: 3" = 1'-0"

TYP. ACT @ WALL 9



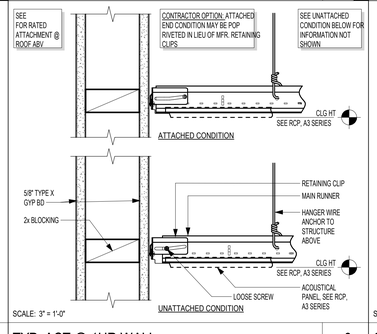
SCALE: 3" = 1'-0"

SUSPENDED ACOUSTICAL TILE CEILING 4



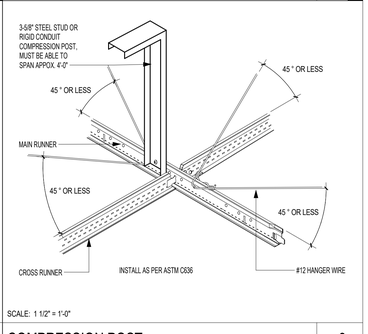
SCALE: 3" = 1'-0"

A.C.T. EDGE TRIM 13



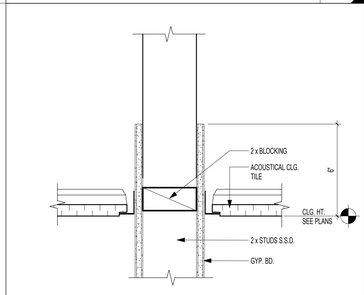
SCALE: 3" = 1'-0"

TYP. ACT @ 1HR WALL 8



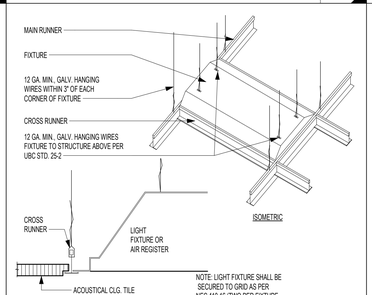
SCALE: 1 1/2" = 1'-0"

COMPRESSION POST 3



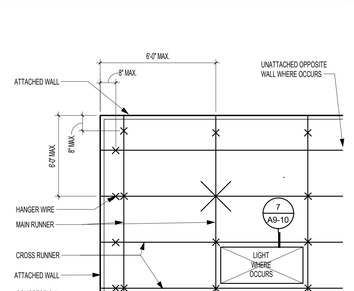
SCALE: 3" = 1'-0"

A.T. CEILING AT STUD WALL 12



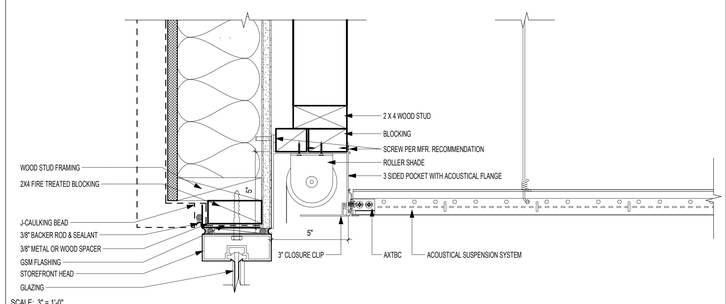
SCALE: 3" = 1'-0"

LIGHT FIXTURE SUPPORT 7



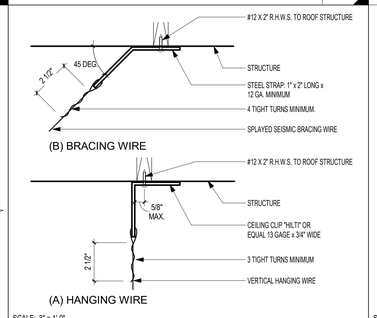
SCALE: 3/8" = 1'-0"

ACT FRAMING PLAN 1



SCALE: 3" = 1'-0"

3 SIDED POCKET ROLLER SHADE @ ACT 11



SCALE: 3" = 1'-0"

TYP. WIRE ATTACHMENT 6

DAHLIN
505 TECHNOLOGY DRIVE,
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949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

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12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

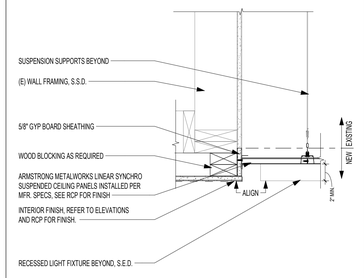
SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

DETAILS - CEILING - SUSPENDED ACT

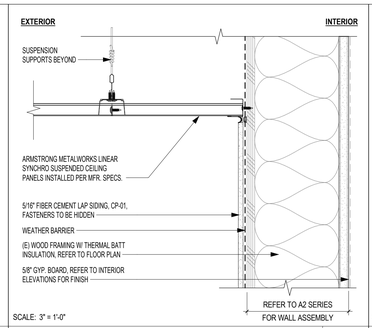
SHEET
A9-10

6/26/2025 4:42:37 PM



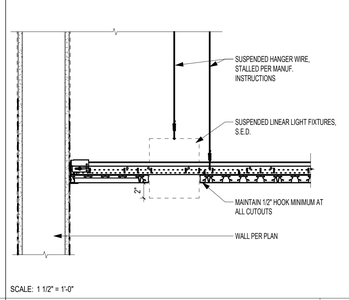
SCALE: 1 1/2" = 1'-0"

METAL WALL PANELS - BASE @ FIN | 15



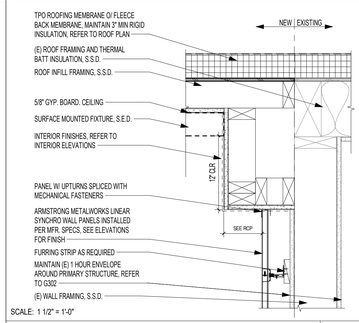
SCALE: 3" = 1'-0"

CP WALL TO EXT MTL CEILING - LONG | 10



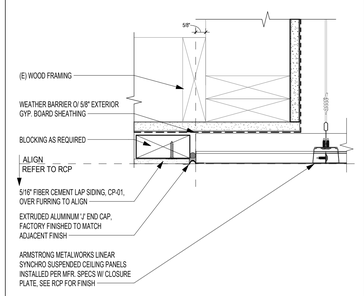
SCALE: 1 1/2" = 1'-0"

SUSPENDED MTL. CLG. - LIGHT INSTALL | 5



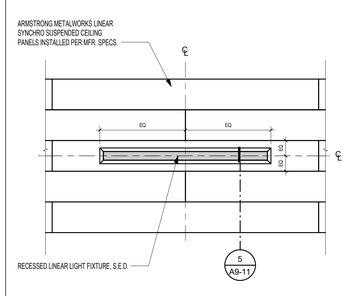
SCALE: 1 1/2" = 1'-0"

VERT. INT. METAL WALL PANELS - HEAD | 14



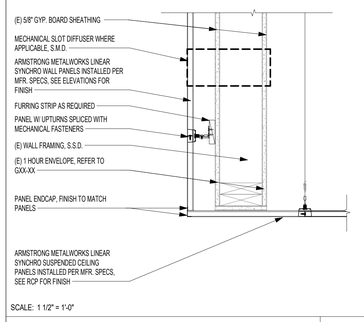
SCALE: 3" = 1'-0"

CP TO EXT MTL CEILING - LONG | 9



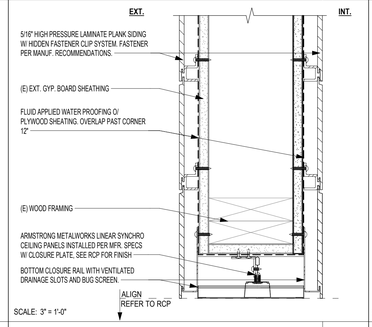
SCALE: 1" = 1'-0"

SUSPENDED MTL. CLG. - LIGHT LOCATION | 4



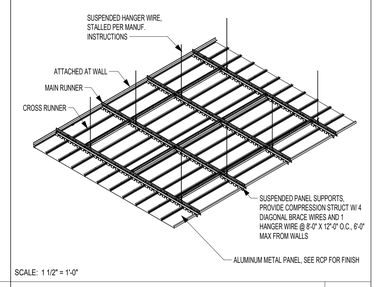
SCALE: 1 1/2" = 1'-0"

VERT. INT. METAL WALL TO CEILING CORNER | 13



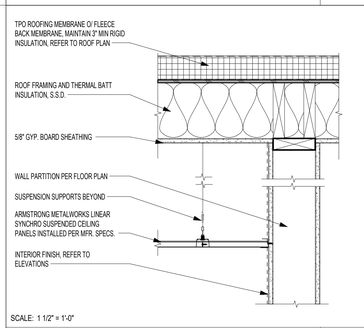
SCALE: 3" = 1'-0"

HPL PANEL (BOTH SIDES) TO EXT MTL CEILING | 8



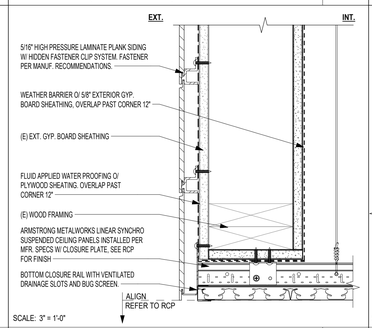
SCALE: 1 1/2" = 1'-0"

SUSPENDED MTL. CLG. - AXONOMETRIC | 3



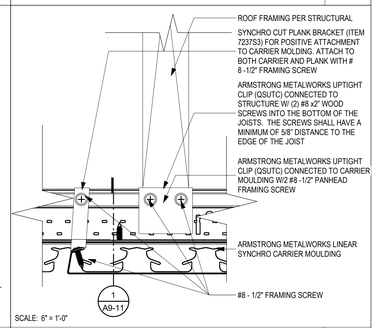
SCALE: 1 1/2" = 1'-0"

SUSP. INT. METAL CEILING PANELS - SIDE VIEW | 12



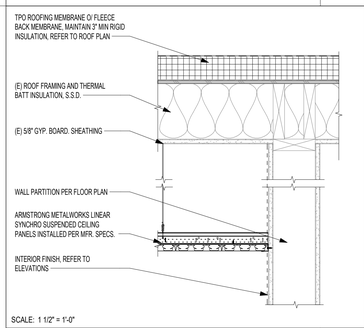
SCALE: 3" = 1'-0"

HPL PANEL TO EXT MTL CEILING - SHORT | 7



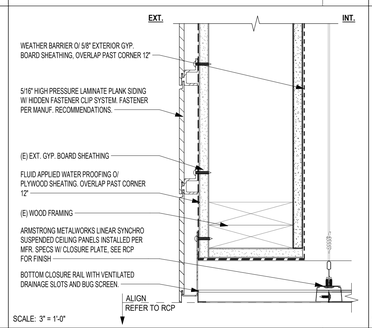
SCALE: 6" = 1'-0"

SUSPENDED MTL. PANEL CEILING @ STRUCTURE | 2



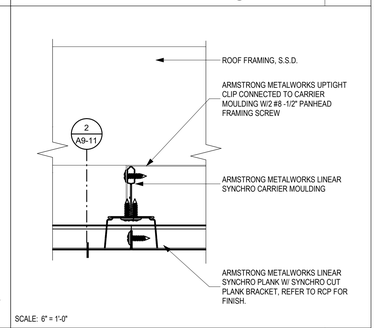
SCALE: 1 1/2" = 1'-0"

SUSP. INT. METAL CEILING PANELS | 11



SCALE: 3" = 1'-0"

HPL PANEL TO EXT MTL CEILING - LONG | 6



SCALE: 6" = 1'-0"

SUSP. MTL. PANEL CEILING @ STRUCTURE | 1

DAHLIN
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949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. **1533.006**

DRAWN **Author**

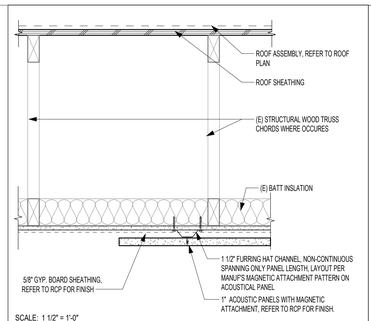
CHECK **Checker**

DETAILS - CEILING - SUSPENDED MTL PANEL

SHEET

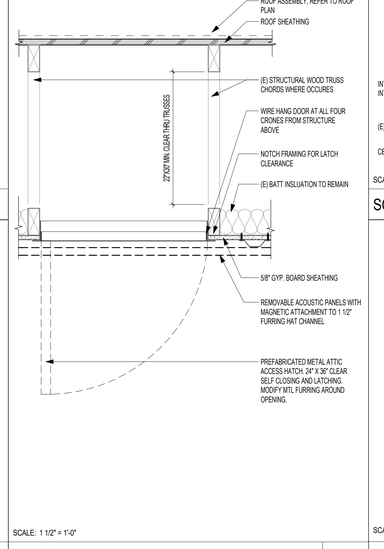
A9-11

6/26/2025 4:42:40 PM



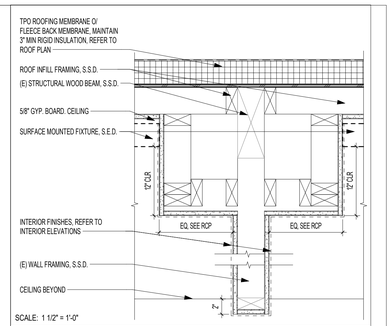
SCALE: 1 1/2" = 1'-0"

ACOUSTIC PANEL @ GYP CEILING 15



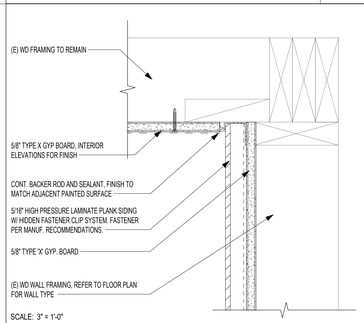
SCALE: 1 1/2" = 1'-0"

ATTIC ACCESS 9



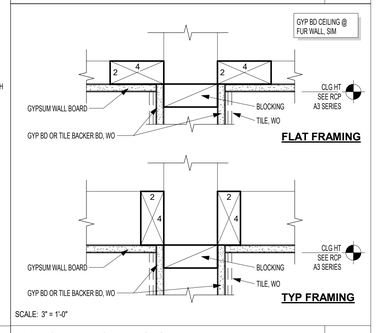
SCALE: 1 1/2" = 1'-0"

SOFFIT @ LOBBY FIXTURE 5



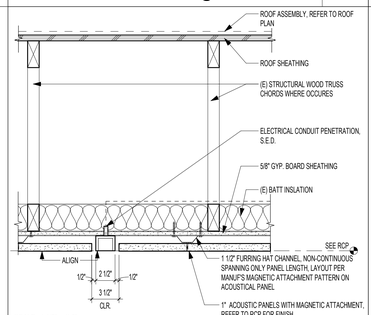
SCALE: 3" = 1'-0"

HPL TO GYP INSIDE CORNER @ INT. CEILING 14



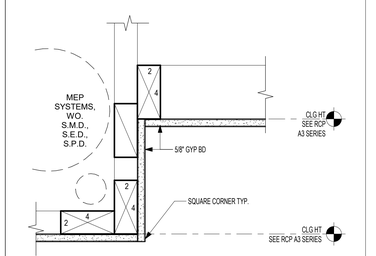
SCALE: 3" = 1'-0"

TYP. GYP BD CEILING @ WALL 4



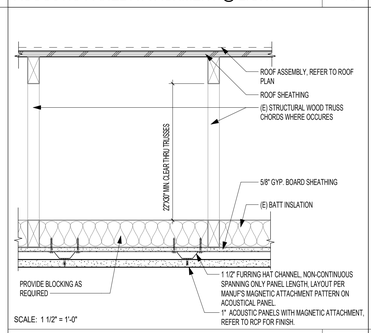
SCALE: 1 1/2" = 1'-0"

ACOUSTIC PANEL ATTACHMENT @ LIGHT 13



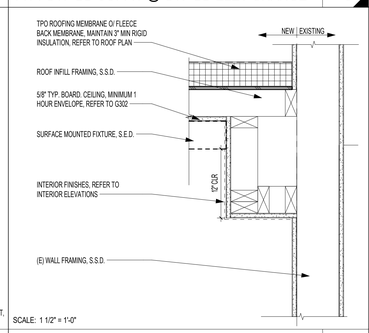
SCALE: 3" = 1'-0"

TYP. GYP BD SOFFIT @ GYP BD ELEV CHANGE 8



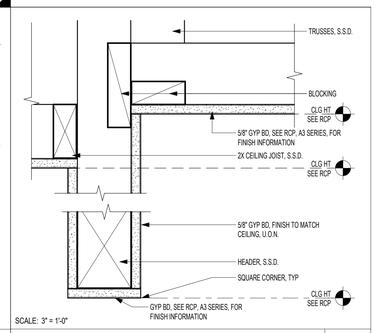
SCALE: 1 1/2" = 1'-0"

ACOUSTIC PANEL ATTACHMENT 12



SCALE: 1 1/2" = 1'-0"

SOFFIT @ LOBBY FIXTURE 7



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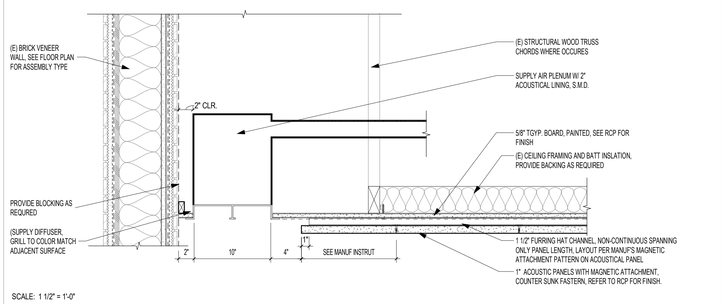
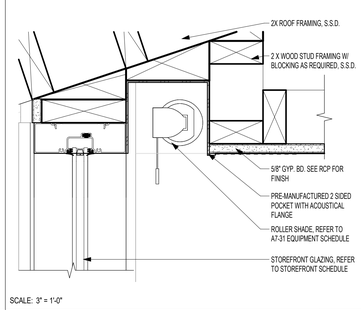
TYP. GYP BD CEILING @ ROOF UNDERSIDE 2



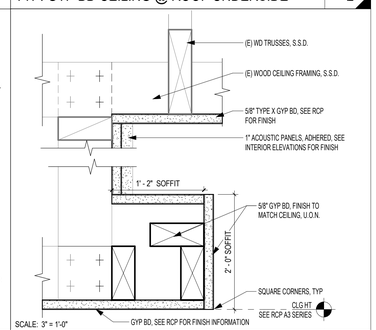
SCALE: 1 1/2" = 1'-0"

ACOUSTIC PANEL ATTACHMENT @ DIFFUSER 11



SCALE: 3" = 1'-0"

2 SIDED ROLLER SHADE POCKET 6



SCALE: 3" = 1'-0"

GYP BD LIGHT SHELF @ EVENT ROOM 1

DAHLIN
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SUITE 200
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949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

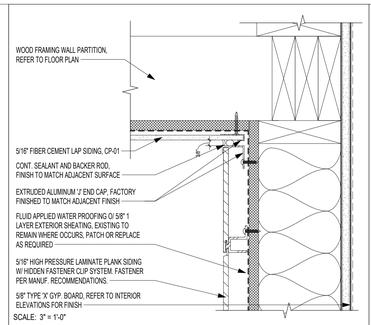
SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	Author
CHECK	Checker

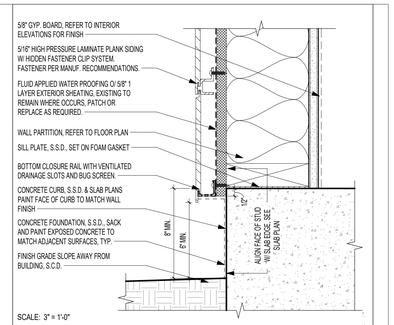
DETAILS - CEILING

SHEET
A9-12

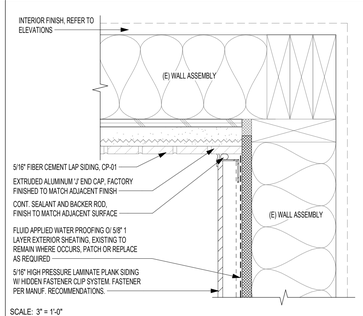
6/26/2025 4:42:43 PM



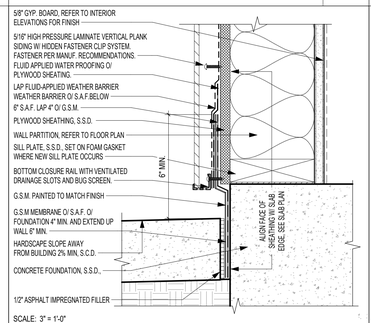
HPL VERT SIDING TO FC SOFFIT INSIDE CORNER 20



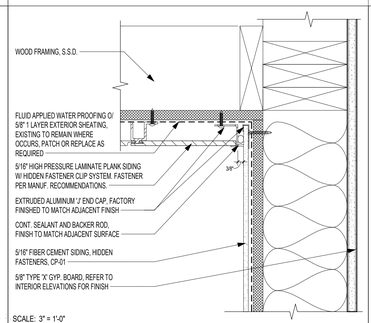
HPL SIDING AT GRADE 5



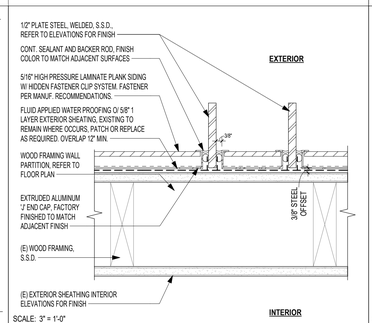
INSIDE CORNER AT FIBER CEMENT PANEL/BRICK 24



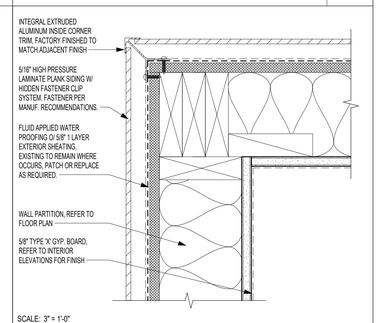
HPL VERT SIDING AT GRADE 19



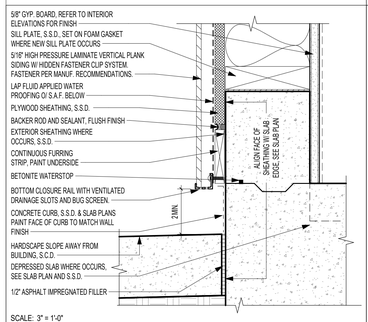
FC SIDING TO HPL SOFFIT INSIDE CORNER 14



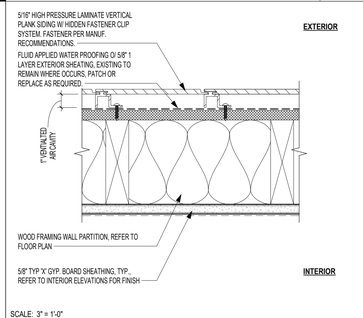
HPL TO MTL COLUMN WRAPS 9



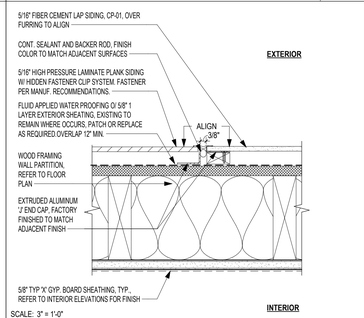
OUTSIDE CORNER @ HPL 4



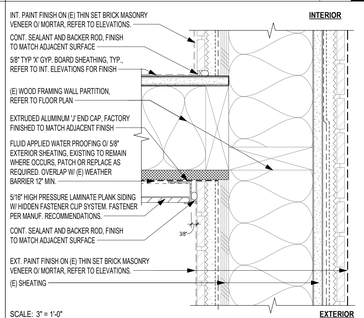
CEILING HPL TO FC OUTSIDE CORNER 23



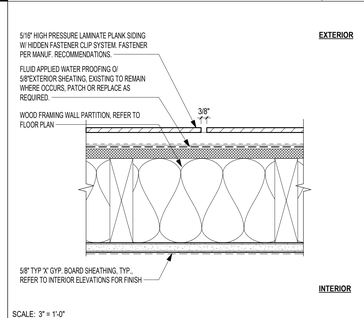
HPL VERT SIDING AT GRADE 18



HPL TO FC INSIDE CORNER 13

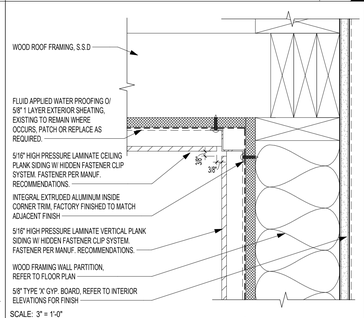


COLUMN WRAP - HEAD 8



INSIDE CORNER @ HPL 3

SD-02 WITH CURB AT HARDSCAPE 15



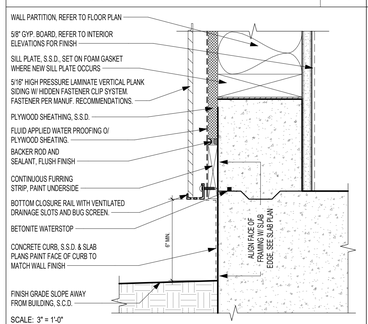
HPL VERT PANEL HEAD INSIDE CORNER 22

HPL VERT SIDING VERTICAL JOINT 17

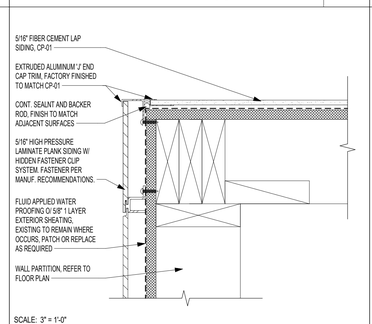
HPL TO FC VERTICAL JOINT 12

HPL SIDING @ (E) BRICK VENEER 7

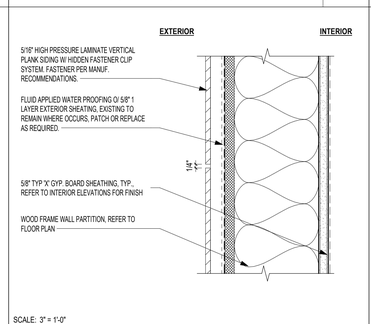
VERTICAL REVEAL @ HPL 2



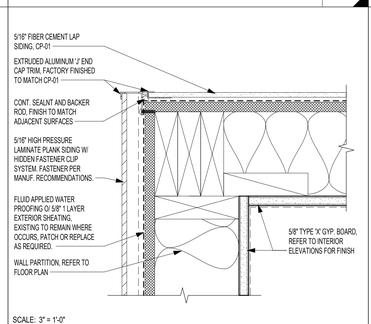
SD-02 WITH CURB AT GRADE 10



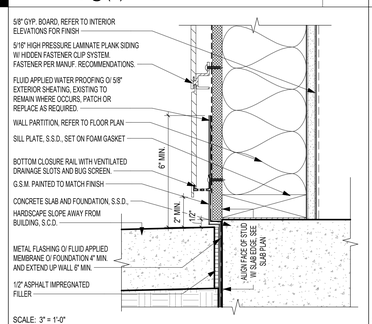
VERT HPL TO FC OUTSIDE CORNER 21



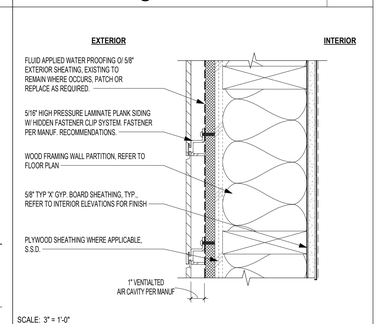
HIGH PRESSURE LAMINATE VERT PANEL (TR-02) 16



HPL TO FC OUTSIDE CORNER 11



HPL SIDING AT GRADE 6



HIGH PRESSURE LAMINATE HORZ. PANEL (TR-01) 1

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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

DETAILS - EXTERIOR - HIGH PRESSURE LAMINATE

SHEET
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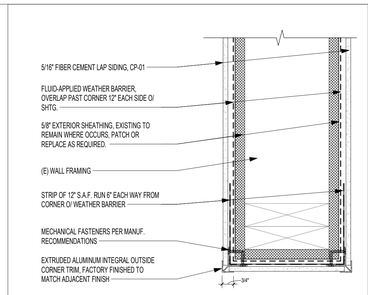
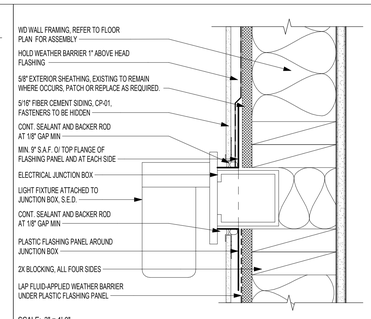


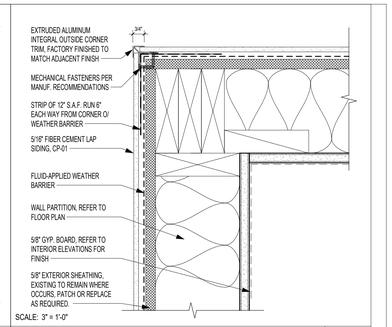
SCALE: 3" = 1'-0"

OUTSIDE CORNER @ FIBER CEMENT PANELS 15



SCALE: 3" = 1'-0"

LIGHT FIXTURE AT FIBER CEMENT PANELS 10



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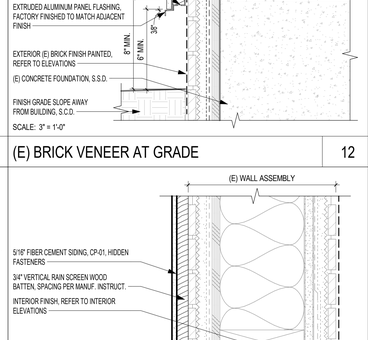
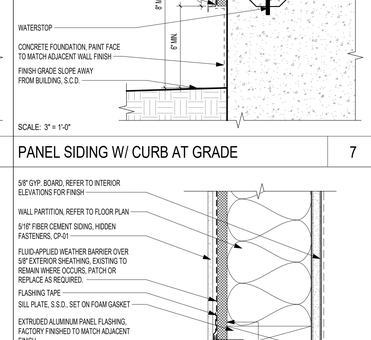
OUTSIDE CORNER @ FIBER CEMENT PANELS 5



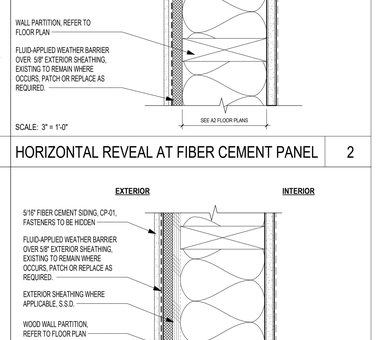
SCALE: 3" = 1'-0"

FIBER CEMENT OVER (E) BRICK - HEAD 14



SCALE: 3" = 1'-0"

PANEL SIDING W/ CURB AT HARDSCAPE 9



SCALE: 3" = 1'-0"

INSIDE CORNER AT FIBER CEMENT PANELS 4

SCALE: 3" = 1'-0"

INSIDE CORNER AT FIBER CEMENT PANEL/BRICK 18

SCALE: 3" = 1'-0"

(E) BRICK VENEER AT HARDSCAPE 13

SCALE: 3" = 1'-0"

PANEL SIDING AT HARDSCAPE 8

SCALE: 3" = 1'-0"

VERTICAL REVEAL AT FIBER CEMENT PANELS 3

SCALE: 3" = 1'-0"

FIBER CEMENT SOFFIT OUTSIDE CORNER 17

SCALE: 3" = 1'-0"

(E) BRICK VENEER AT GRADE 12

SCALE: 3" = 1'-0"

PANEL SIDING W/ CURB AT GRADE 7

SCALE: 3" = 1'-0"

HORIZONTAL REVEAL AT FIBER CEMENT PANEL 2

SCALE: 3" = 1'-0"

FIBER CEMENT SOFFIT INSIDE CORNER 16

SCALE: 3" = 1'-0"

FIBER CEMENT OVER (E) BRICK - TYPE 2 (CP-01) 11

SCALE: 3" = 1'-0"

PANEL SIDING AT GRADE 6

SCALE: 3" = 1'-0"

FIBER CEMENT PANEL - TYPE 1 (CP-01) 1

DAHLIN
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CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
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PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

DETAILS - EXTERIOR - FIBER CEMENT PANELS

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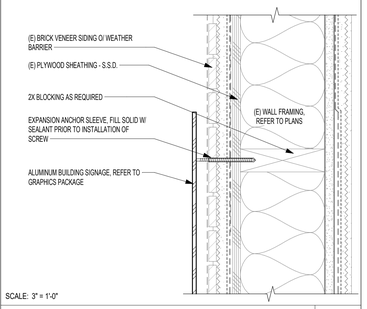
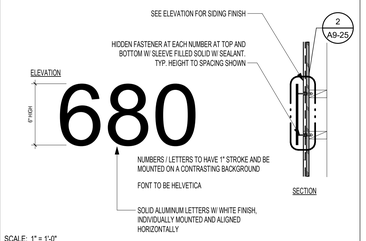


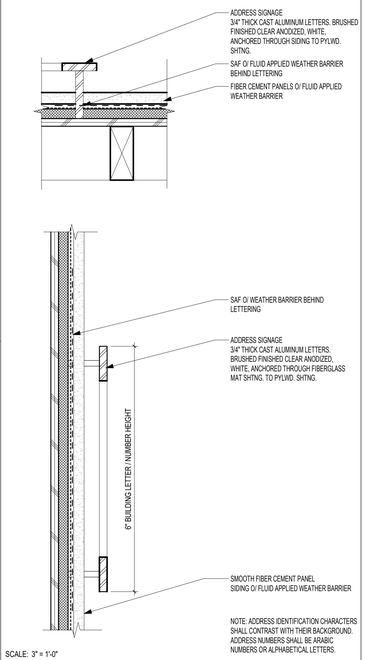
SCALE: 3" = 1'-0"

BUILDING LETTER / NUMBER SUPPORT | 5



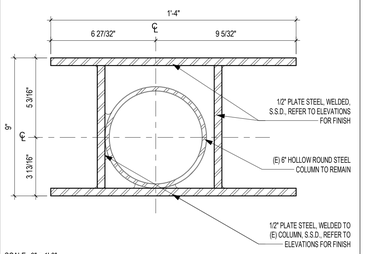
SCALE: 1" = 1'-0"

BUILDING LETTER / NUMBERS | 4



SCALE: 3" = 1'-0"

BUILDING LETTER @ SIDING | 2



SCALE: 3" = 1'-0"

ENTRY CANOPY - STEEL COLUMN WRAP | 1

DAHLIN
505 TECHNOLOGY DRIVE,
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CITY OF LAKEWOOD CALIFORNIA

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PW-23-01

BID SET 06.03.25

REVISIONS

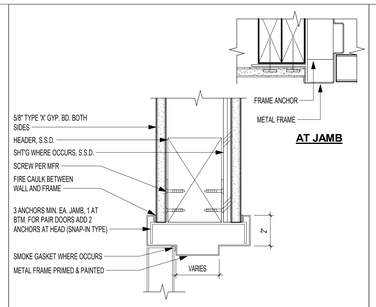
SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

DETAILS - EXTERIOR

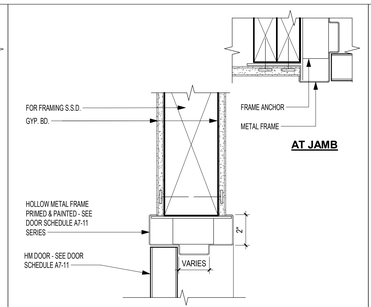
SHEET
A9-25

6/26/2025 4:42:49 PM



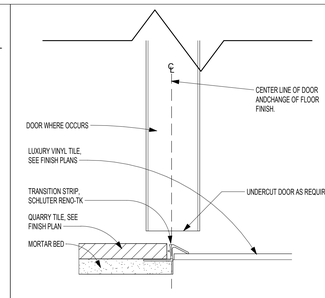
SCALE: 3" = 1'-0"

0, 20, & 60 MINUTE DOOR HEAD/JAMB 19



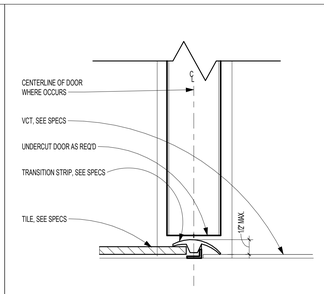
SCALE: 3" = 1'-0"

TYPICAL INT HM DOOR FRAME AT HEAD & JAMB 20



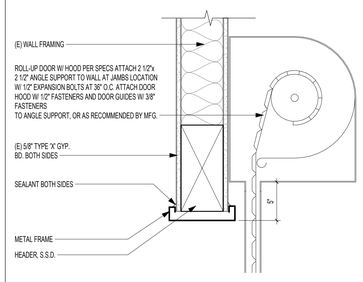
SCALE: 6" = 1'-0"

QUARRY TILE TO LVT TRANSITION 10



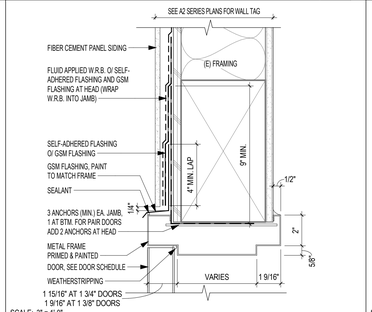
SCALE: 6" = 1'-0"

TILE TO VINYL TRANSITION 5



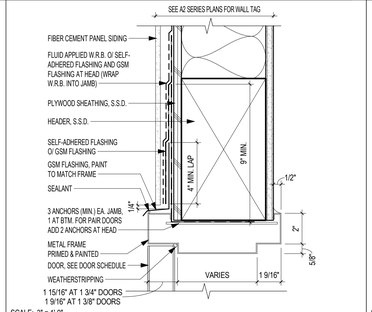
SCALE: 1 1/2" = 1'-0"

INT. ROLL-UP DOOR HEAD 23



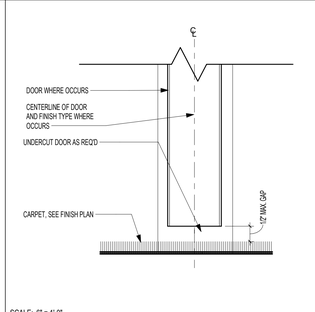
SCALE: 3" = 1'-0"

OUTSWING DOOR HEAD AT (E) WALL 17



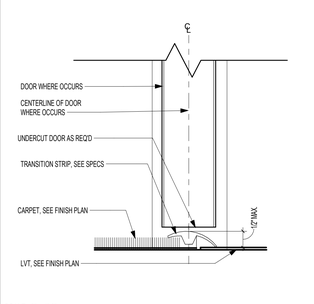
SCALE: 3" = 1'-0"

OUTSWING DOOR HEAD AT F.C. SIDING 13



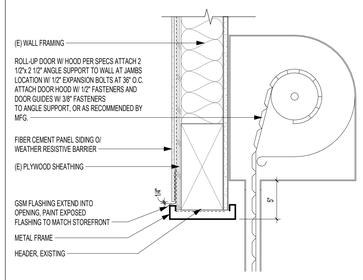
SCALE: 6" = 1'-0"

CARPET TO CARPET TRANSITION 9



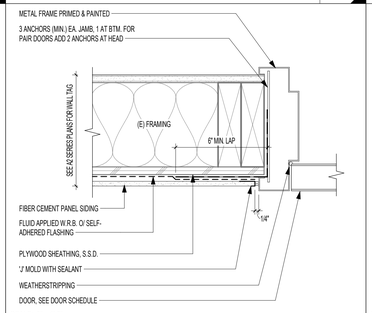
SCALE: 6" = 1'-0"

CARPET TO VINYL TRANSITION AT DOOR 4



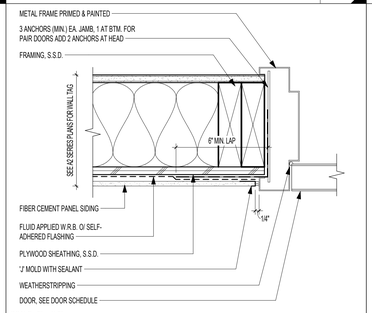
SCALE: 1 1/2" = 1'-0"

EXT. ROLL-UP DOOR HEAD 21



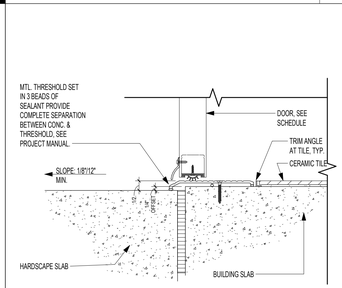
SCALE: 3" = 1'-0"

OUTSWING DOOR JAMB AT (E) WALL 18



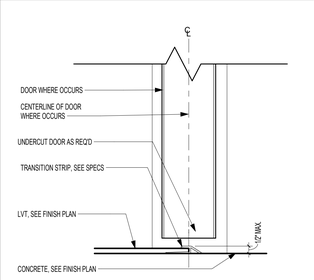
SCALE: 3" = 1'-0"

OUTSWING DOOR JAMB AT PANEL SIDING 14



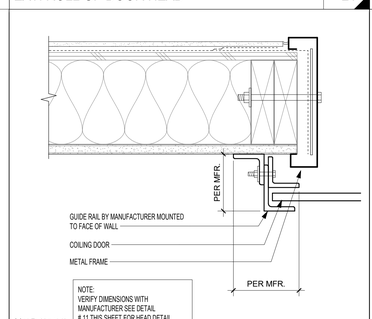
SCALE: 3" = 1'-0"

THRESHOLD - EXT. TO TILE TRANSITION 8



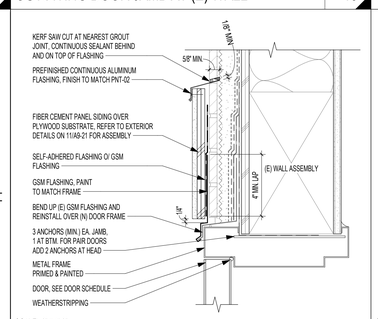
SCALE: 6" = 1'-0"

VINYL TO CONCRETE TRANSITION 3



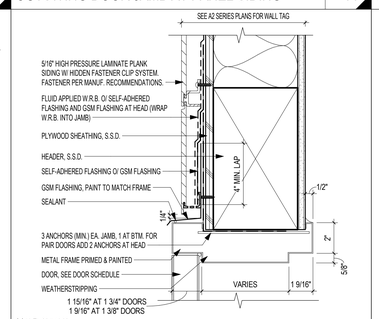
SCALE: 3" = 1'-0"

EXT. ROLL-UP DOOR JAMB 22



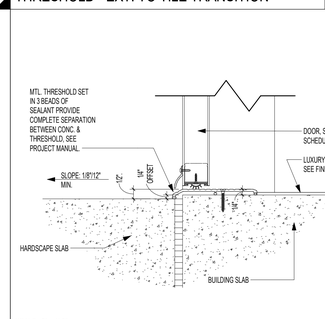
SCALE: 3" = 1'-0"

OUTSWING DOOR HEAD AT F.C. O/ (E) BRICK 12



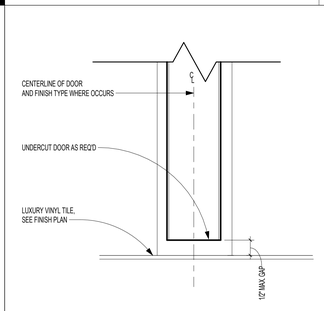
SCALE: 3" = 1'-0"

OUTSWING DOOR HEAD AT HPL 15



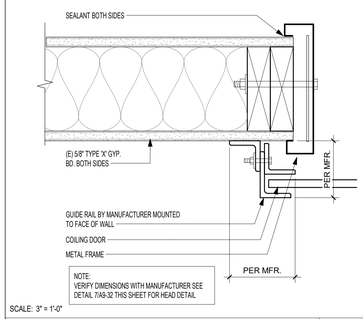
SCALE: 3" = 1'-0"

THRESHOLD - EXT. TO LVT TRANSITION 7



SCALE: 6" = 1'-0"

VINYL TO VINYL TRANSITION 2



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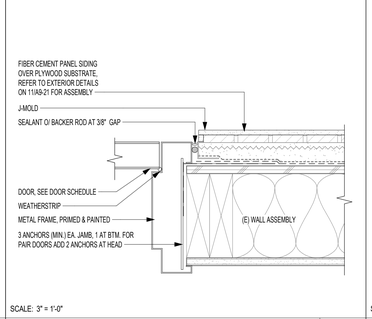
INT. ROLL-UP DOOR JAMB 24



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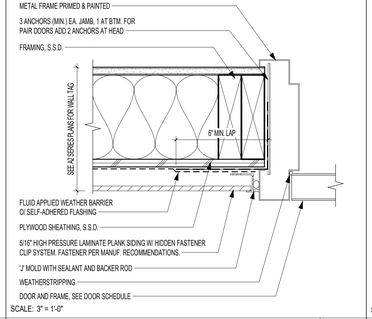
OUTSWING DOOR JAMB AT F.C. O/ (E) BRICK 11



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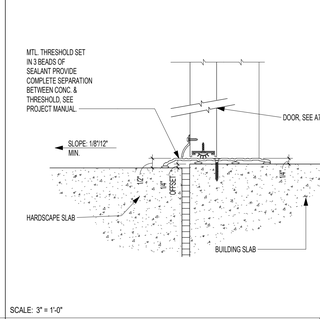
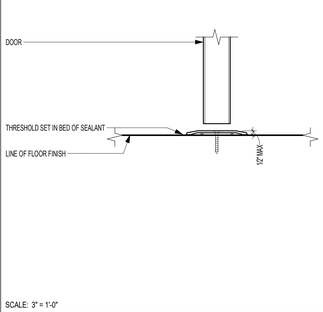
OUTSWING DOOR JAMB AT HPL 16



SCALE: 3" = 1'-0"

THRESHOLD - EXT. TO CONC. TRANSITION 6



SCALE: 3" = 1'-0"

INTERIOR FIRE RATED DOOR THRESHOLD 1

DAHLIN
505 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

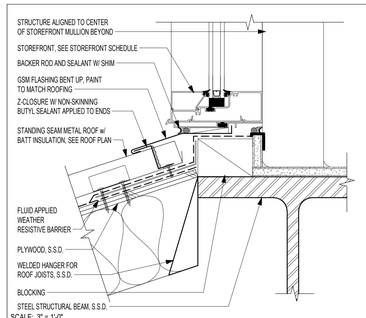
SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	Author
CHECK	Checker

DETAILS - DOOR

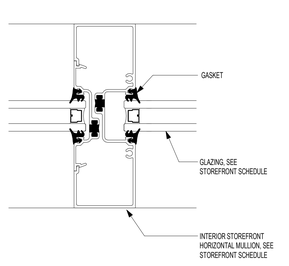
SHEET
A9-30

6/26/2025 4:42:52 PM



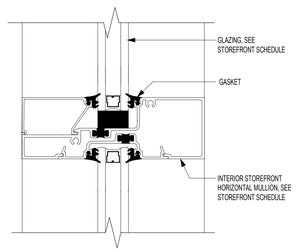
SCALE: 3" = 1'-0"

EXT. S.F. SILL @ STANDING SEAM ROOF 30



SCALE: 6" = 1'-0"

EXT. STOREFRONT VERTICAL MULLION 25



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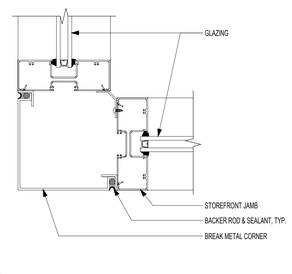
EXT. STOREFRONT HORIZONTAL MULLION 20



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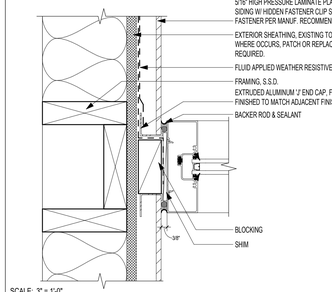
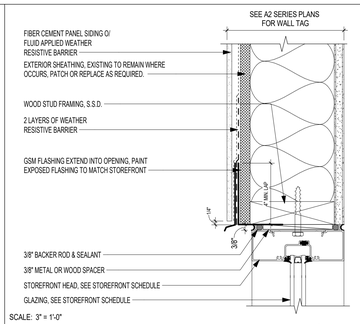
EXT. STOREFRONT CORNER MULLION 15



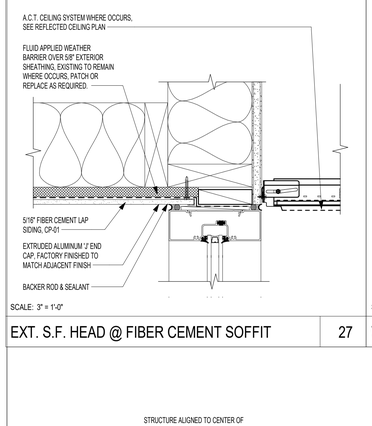
SCALE: 3" = 1'-0"

EXT. STOREFRONT JAMB AT HPL 10



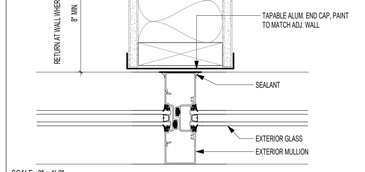
SCALE: 3" = 1'-0"

EXT. S.F. HEAD @ FIBER CEMENT BD. 5



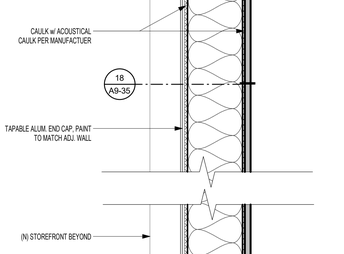
SCALE: 3" = 1'-0"

EXT. STOREFRONT HEAD @ HPL SOFFIT 29



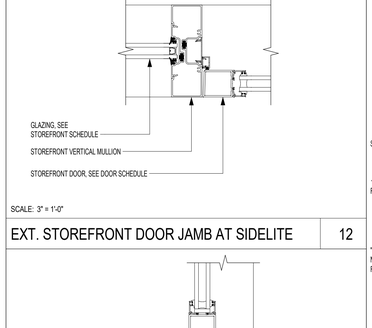
SCALE: 3" = 1'-0"

EXT. STOREFRONT JAMB @ (E) BRICK VENEER 24



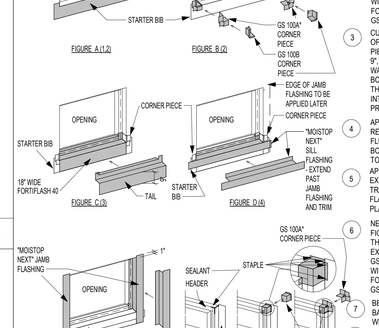
SCALE: 3" = 1'-0"

EXT. STOREFRONT JAMB AT CORNER 19



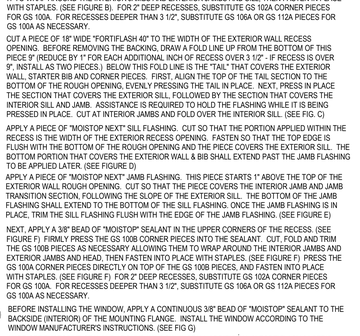
SCALE: 3" = 1'-0"

EXT. S.F. DOOR HEAD @ FIBER CEMENT BD. 14



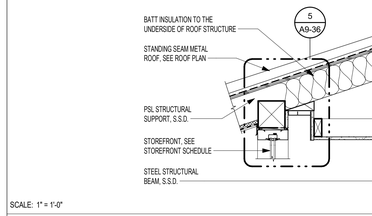
SCALE: 3" = 1'-0"

EXT. STOREFRONT JAMB AT HPL 9



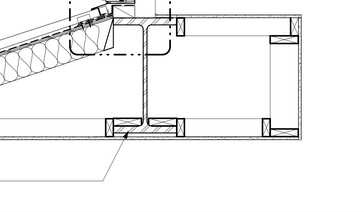
SCALE: 3" = 1'-0"

EXT. S.F. JAMB @ FIBER CEMENT PANEL 4



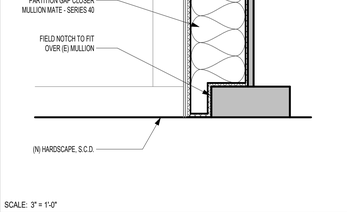
SCALE: 3" = 1'-0"

EXT. STOREFRONT HEAD @ METAL PNL. SOFFIT 28



SCALE: 3" = 1'-0"

STOREFRONT AT (E) MULLION 23



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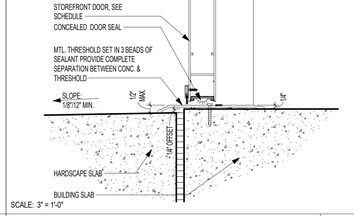
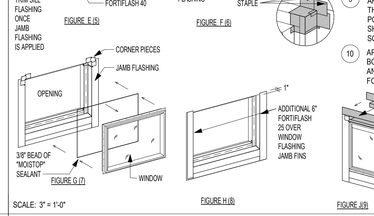
STOREFRONT AT (E) GLAZING 18



SCALE: 3" = 1'-0"

EXT. STOREFRONT DOOR HEAD @ TRANSOM 13



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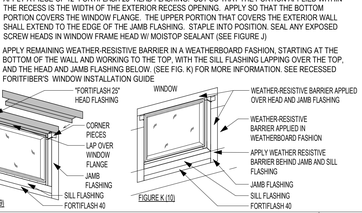
EXT. S.F. SILL @ HPL 8



SCALE: 3" = 1'-0"

TYP. EXT. STOREFRONT SILL 3

SCALE: 3" = 1'-0"

EXT. S.F. HEAD @ FIBER CEMENT SOFFIT 27

SCALE: 3" = 1'-0"

WALL AT MULLION 22

SCALE: 1" = 1'-0"

TYP. EXT. STOREFRONT SILL 21

SCALE: 3" = 1'-0"

STOREFRONT AT (E) GLAZING SECTION 16

SCALE: 3" = 1'-0"

TYP. EXT. STOREFRONT DOOR SILL 11

FLASHING OF RECESSED WINDOWS

1. APPLY 12" WIDE PIECE OF "MOISTOP NEXT" STARTER BIB 3" ABOVE BOTTOM OF THE SLOPED SILL. CUT AND REMOVE THE SECTION BETWEEN THE EXTERIOR JAMBS. (FIGURE A)
2. NEXT, PLACE A 3/8" BEAD OF "MOISTOP" SEALANT IN THE LOWER CORNERS OF THE SILL (SEE FIGURE A). FIRMLY PRESS THE GS 100A CORNER PIECES INTO THE SEALANT AND FASTEN AT THE TOP EDGES WITH STAPLES. (SEE FIGURE B). PRESS THE GS 100B CORNER PIECES DIRECTLY ON TOP OF THE GS 100A PIECES. CUT, FOLD AND TRIM THE GS 100B PIECES AS NECESSARY ALLOWING IT TO WRAP AROUND THE INTERIOR JAMBS AND EXTERIOR JAMBS AND SILL, THEN FASTEN IN PLACE WITH STAPLES. (SEE FIGURE B). FOR 2" DEEP RECESSES, SUBSTITUTE GS 102A CORNER PIECES FOR GS 100A. FOR RECESSES DEEPER THAN 3 1/2", SUBSTITUTE GS 106A OR GS 112A PIECES FOR GS 100A AS NECESSARY.
3. CUT A PIECE OF 18" WIDE "FORTIFLASH 40" TO THE WIDTH OF THE EXTERIOR WALL RECESS OPENING. BEFORE REMOVING THE BACKING, DRAW A FOLD LINE UP FROM THE BOTTOM OF THIS PIECE 9" (REDUCE BY 1" FOR EACH ADDITIONAL INCH OF RECESS OVER 3 1/2" - IF RECESS IS OVER 9", INSTALL AS TWO PIECES.) BELOW THIS FOLD LINE IS THE "TAIL" THAT COVERS THE EXTERIOR WALL, STARTER BIB AND CORNER PIECES. FIRST, ALIGN THE TOP OF THE TAIL SECTION TO THE BOTTOM OF THE ROUGH OPENING, EVENLY PRESSING THE TAIL IN PLACE. NEXT, PRESS IN PLACE THE SECTION THAT COVERS THE EXTERIOR SILL, FOLLOWED BY THE SECTION THAT COVERS THE INTERIOR SILL AND JAMB. ASSISTANCE IS REQUIRED TO HOLD THE FLASHING WHILE IT IS BEING PRESSED IN PLACE. CUT AT INTERIOR JAMBS AND FOLD OVER THE INTERIOR SILL. (SEE FIG. C)
4. APPLY A PIECE OF "MOISTOP NEXT" SILL FLASHING. CUT SO THAT THE PORTION APPLIED WITHIN THE RECESS IS THE WIDTH OF THE EXTERIOR RECESS OPENING. FASTEN SO THAT THE TOP EDGE IS FLUSH WITH THE BOTTOM OF THE ROUGH OPENING AND THE PIECE COVERS THE EXTERIOR SILL. THE BOTTOM PORTION THAT COVERS THE EXTERIOR WALL & BIB SHALL EXTEND PAST THE JAMB FLASHING TO BE APPLIED LATER. (SEE FIGURE D)
5. APPLY A PIECE OF "MOISTOP NEXT" JAMB FLASHING. THIS PIECE STARTS 1" ABOVE THE TOP OF THE EXTERIOR WALL ROUGH OPENING. CUT SO THAT THE PIECE COVERS THE INTERIOR JAMB AND JAMB TRANSITION SECTION, FOLLOWING THE SLOPE OF THE EXTERIOR SILL. THE BOTTOM OF THE JAMB FLASHING SHALL EXTEND TO THE BOTTOM OF THE SILL FLASHING. ONCE THE JAMB FLASHING IS IN PLACE, TRIM THE SILL FLASHING FLUSH WITH THE EDGE OF THE JAMB FLASHING. (SEE FIGURE E)
6. NEXT, APPLY A 3/8" BEAD OF "MOISTOP" SEALANT IN THE UPPER CORNERS OF THE RECESS. (SEE FIGURE F) FIRMLY PRESS THE GS 100B CORNER PIECES INTO THE SEALANT. CUT, FOLD AND TRIM THE GS 100B PIECES AS NECESSARY ALLOWING THEM TO WRAP AROUND THE INTERIOR JAMBS AND EXTERIOR JAMBS AND HEAD, THEN FASTEN INTO PLACE WITH STAPLES. (SEE FIGURE F) PRESS THE GS 100A CORNER PIECES DIRECTLY ON TOP OF THE GS 100B PIECES, AND FASTEN INTO PLACE WITH STAPLES. (SEE FIGURE F) FOR 2" DEEP RECESSES, SUBSTITUTE GS 102A CORNER PIECES FOR GS 100A. FOR RECESSES DEEPER THAN 3 1/2", SUBSTITUTE GS 106A OR GS 112A PIECES FOR GS 100A AS NECESSARY.
7. BEFORE INSTALLING THE WINDOW, APPLY A CONTINUOUS 3/8" BEAD OF "MOISTOP" SEALANT TO THE BACKSIDE (INTERIOR) OF THE MOUNTING FLANGE. INSTALL THE WINDOW ACCORDING TO THE WINDOW MANUFACTURER'S INSTRUCTIONS. (SEE FIG G)
8. WIPE OFF EXCESSIVE SEALANT AROUND WINDOW. INSTALL ADDITIONAL 6" FORTIFLASH 25 STRIP OVER WINDOW FLANGES AT JAMB. (SEE FIG H)
9. APPLY A PIECE OF 12" FORTIFLASH 25" HEAD FLASHING. CUT SO THAT THE PORTION APPLIED WITHIN THE RECESS IS THE WIDTH OF THE EXTERIOR RECESS OPENING. APPLY SO THAT THE BOTTOM PORTION COVERS THE WINDOW FLANGE. THE UPPER PORTION THAT COVERS THE EXTERIOR WALL SHALL EXTEND TO THE EDGE OF THE JAMB FLASHING. STAPLE INTO POSITION. SEAL ANY EXPOSED SCREW HEADS IN WINDOW FRAME HEAD W/ MOISTOP SEALANT (SEE FIGURE J)
10. APPLY REMAINING WEATHER-RESISTIVE BARRIER IN A WEATHERBOARD FASHION, STARTING AT THE BOTTOM OF THE WALL AND WORKING TO THE TOP, WITH THE SILL FLASHING LAPPING OVER THE TOP, AND THE HEAD AND JAMB FLASHING BELOW. (SEE FIG. K) FOR MORE INFORMATION. SEE RECESSED FORTIFIBER'S WINDOW INSTALLATION GUIDE

FORTIFIBER RECESSED WINDOW FLASHING SYSTEM 1

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

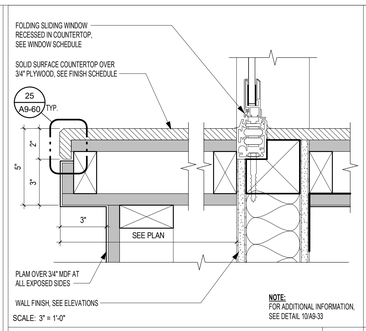
SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

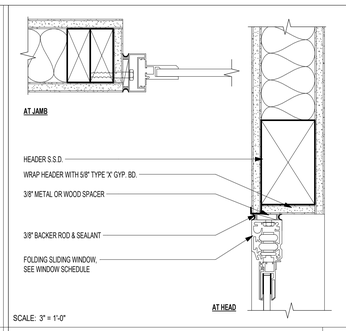
DETAILS - STOREFRONT

SHEET
A9-35

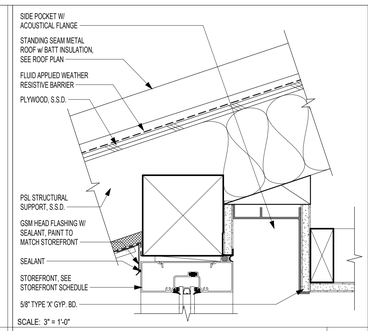
6/26/2025 4:42:55 PM



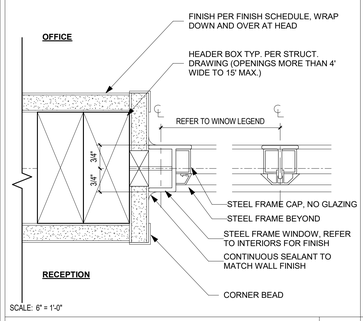
FOLDING WINDOW SILL @ BOTTOM CASEWORK | 15



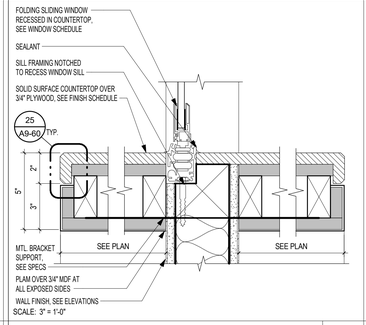
FOLDING WINDOW HEAD & JAMB | 10



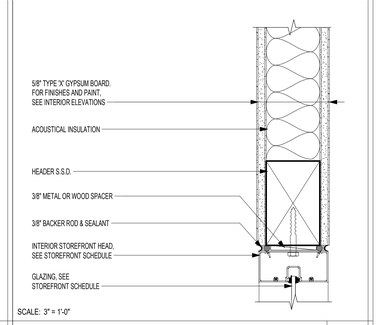
TYP. EXT. STOREFRONT SILL | 5



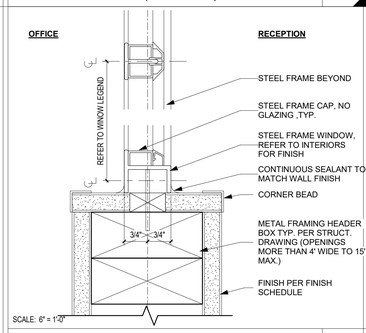
STEEL FRAME JAMB (HEAD SIM.) | 14



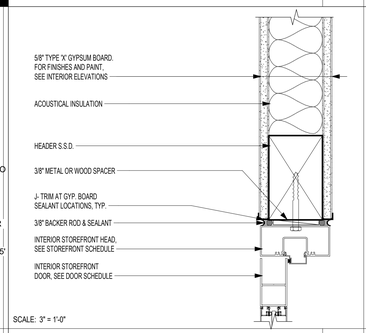
FOLDING WINDOW SILL | 9



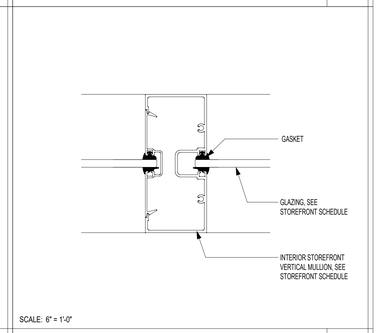
TYP. INT. STOREFRONT HEAD & JAMB | 4



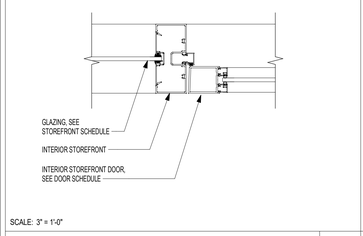
STEEL FRAME SILL | 13



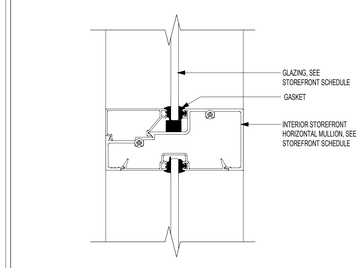
TYP. INT. STOREFRONT DOOR HEAD | 8



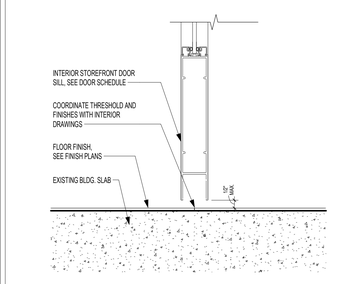
INT. STOREFRONT MULLION VERTICAL | 3



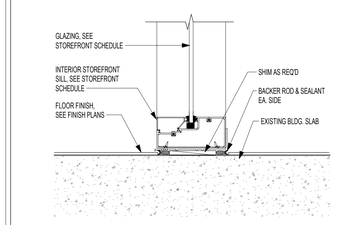
INT. STOREFRONT DOOR JAMB | 7



INT. STOREFRONT MULLION HORIZONTAL | 2



INT. STOREFRONT DOOR SILL | 6



INT. STOREFRONT SILL | 1

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CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

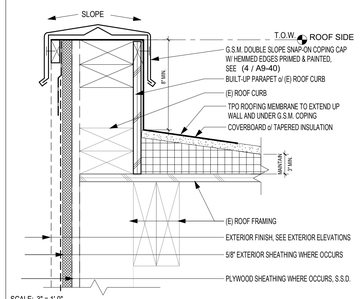
SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

DETAILS - STOREFRONT

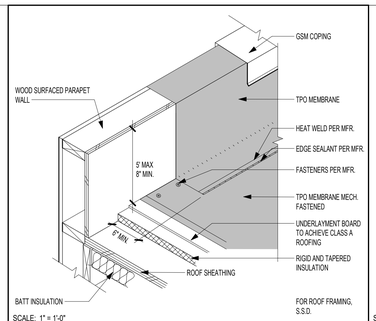
SHEET
A9-36

6/26/2025 4:42:57 PM



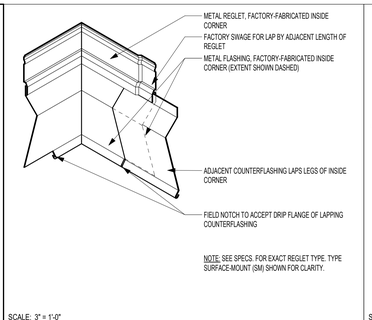
SCALE: 3" = 1'-0"

PARAPET BUILD-UP AND DBL SLOPE CAP | 20



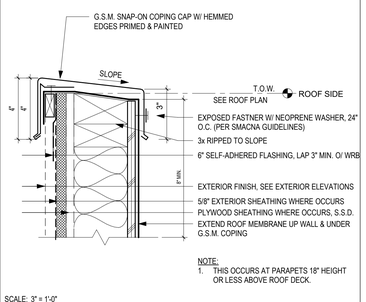
SCALE: 1" = 1'-0"

LOW PARAPET | 15



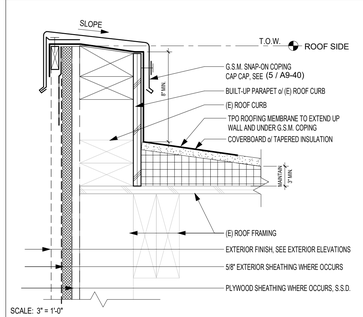
SCALE: 3" = 1'-0"

TYP. REGLET AT INSIDE CORNER | 10



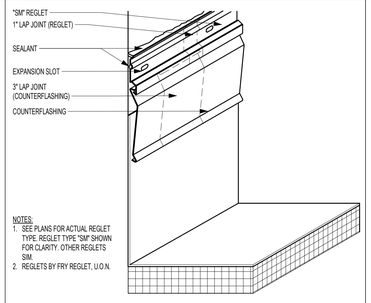
SCALE: 3" = 1'-0"

TPO WRAP PARAPET & CAP | 5



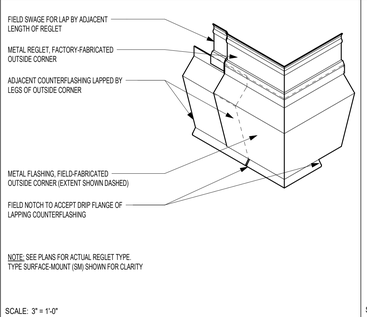
SCALE: 3" = 1'-0"

PARAPET BUILD-UP AND CAP | 19



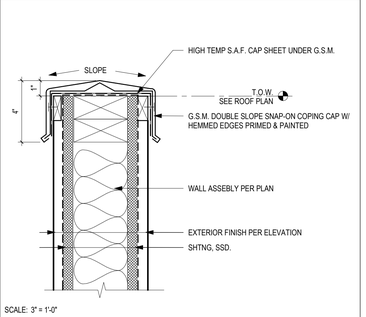
NOT TO SCALE

TYP. REGLET-LAP JOINT | 14



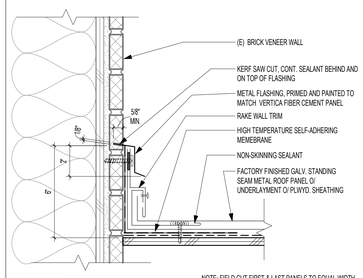
SCALE: 3" = 1'-0"

TYP. REGLET AT OUTSIDE CORNER | 9



SCALE: 3" = 1'-0"

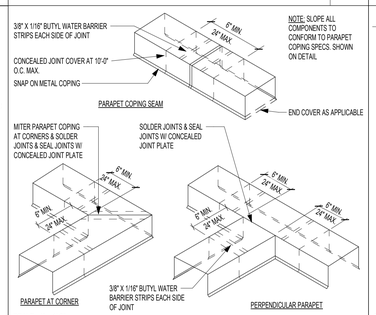
DOUBLE SLOPE PARAPET CAP | 4



SCALE: 3" = 1'-0"

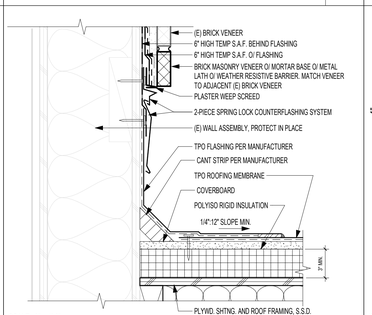
NOTE: FIELD CUT FIRST & LAST PANELS TO EQUAL WIDTH

STANDING SEAM MTL. ROOF PARALLEL TO BRICK | 18



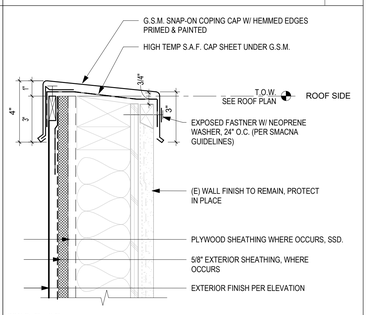
SCALE: 1" = 1'-0"

TYP. G.S.M. PARAPET COPING TRANSITIONS | 13



SCALE: 3" = 1'-0"

TYP. PARAPET WALL BASE AT EXT. BRICK VENEER | 8



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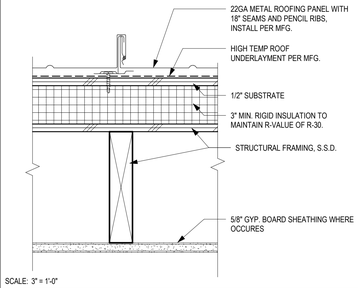
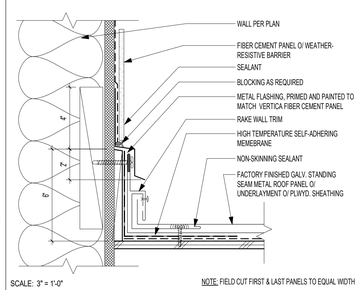
TYP. PARAPET CAP | 3



SCALE: 3" = 1'-0"

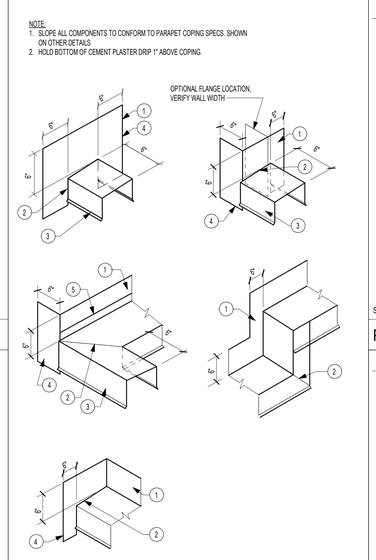
METAL ROOF ASSEMBLY (RF-01) | 22



SCALE: 3" = 1'-0"

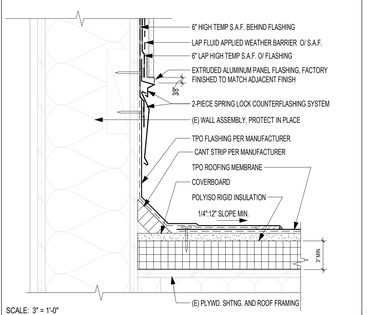
NOTE: FIELD CUT FIRST & LAST PANELS TO EQUAL WIDTH

STANDING SEAM MTL. ROOF PARALLEL TO F.C.P. | 17



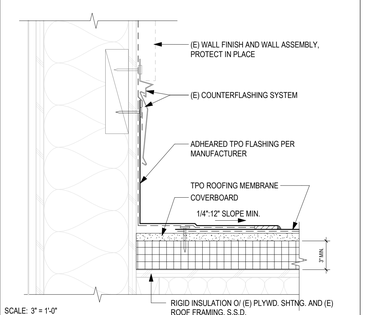
NOT TO SCALE

PARAPET COPING / FLASHING AT WALL | 11



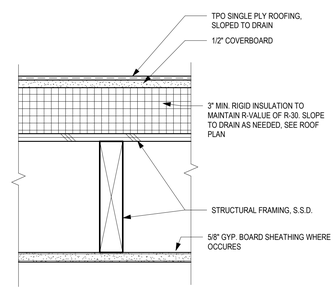
SCALE: 3" = 1'-0"

PARAPET WALL BASE AT EXT. F.C.P. | 7



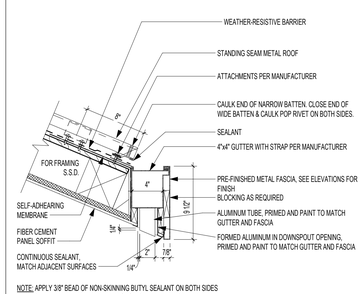
SCALE: 3" = 1'-0"

TYP. PARAPET WALL BASE AT (E) EXT. FINISH | 2



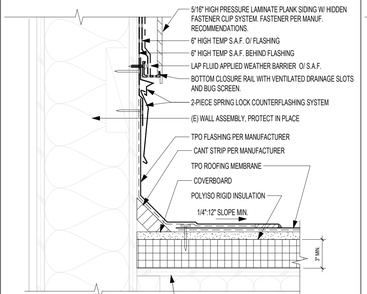
SCALE: 3" = 1'-0"

TPO ASSEMBLY (RT-02) | 21



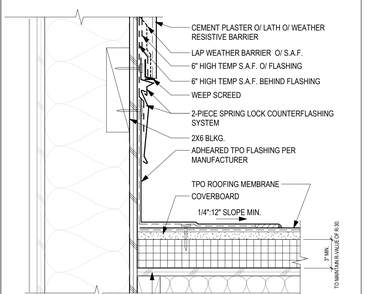
SCALE: 1 1/2" = 1'-0"

STANDING SEAM EAVE | 16



SCALE: 3" = 1'-0"

TYP. PARAPET WALL BASE AT EXT. HPL | 6



SCALE: 3" = 1'-0"

PARAPET WALL BASE AT EXT. PLASTER | 1

6/26/2025 4:43:00 PM

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

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12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

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REVISIONS

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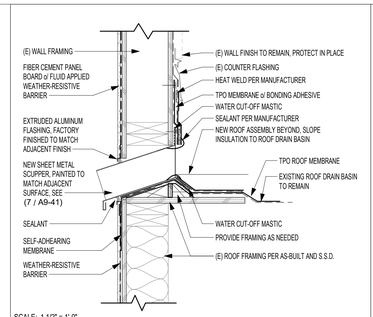
DRAWN Author
CHECK Checker

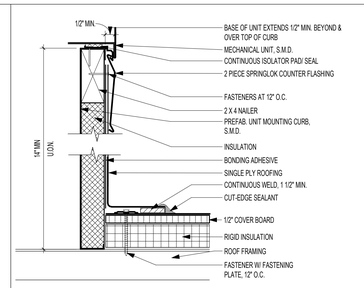
DETAILS - ROOF

SHEET
A9-40



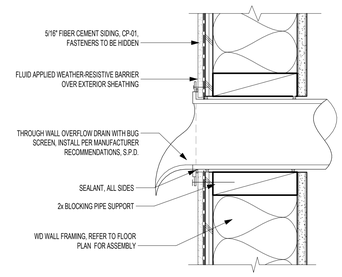
SCALE: 1 1/2" = 1'-0"

THRU WALL OVERFLOW SCUPPER AT F.C.P. 10



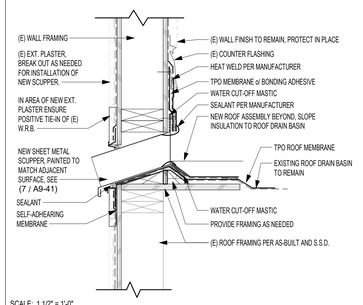
SCALE: 3" = 1'-0" FOR FRAMING, S.S.D.

PREFAB. MECH. UNIT CURB 5



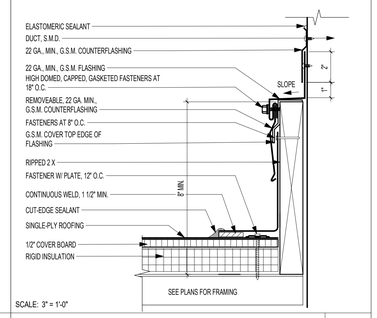
SCALE: 3" = 1'-0"

OVERFLOW NOZZLE AT FIBER CEMENT PANEL 14



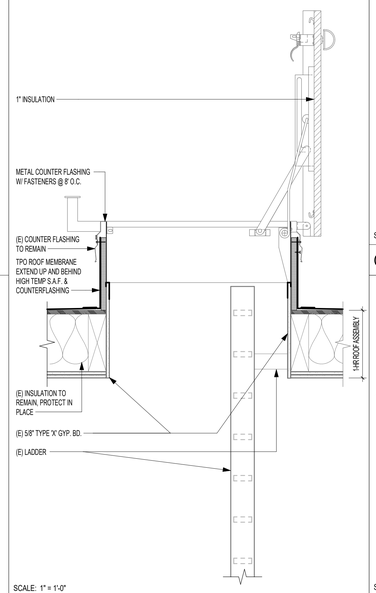
SCALE: 1 1/2" = 1'-0"

THRU WALL OVERFLOW SCUPPER AT (E) PLASTER 9



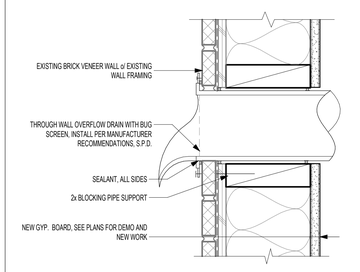
SCALE: 3" = 1'-0"

DUCT PENETRATION AT ROOF 4



SCALE: 1" = 1'-0"

(E) ROOF HATCH AT TPO ROOF 17



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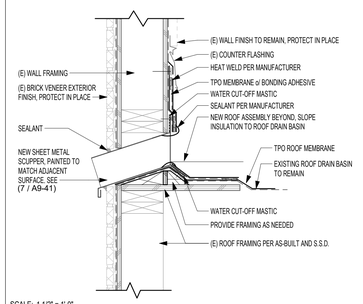
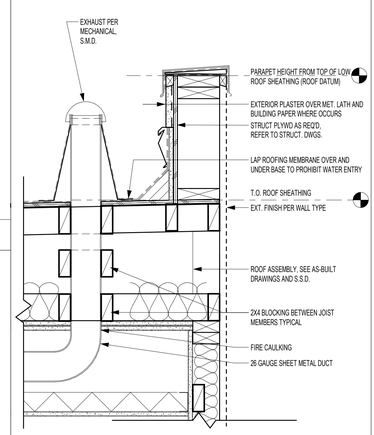
OVERFLOW NOZZLE AT BRICK 13



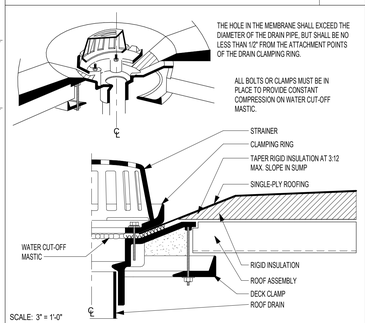
SCALE: 1 1/2" = 1'-0"

THRU WALL OVERFLOW SCUPPER AT (E) BRICK 8



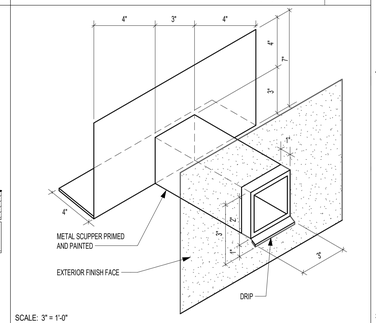
SCALE: 1 1/2" = 1'-0"

EXHAUST FAN ROOF PENETRATION 2



SCALE: 3" = 1'-0"

ROOF DRAIN W/ SUMP 12



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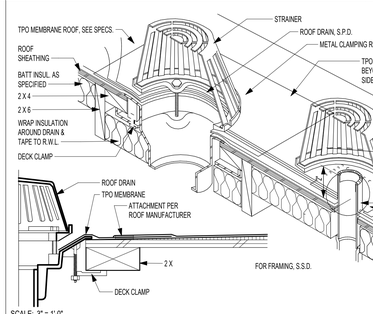
SCUPPER 7



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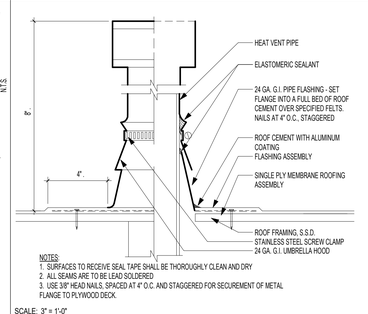
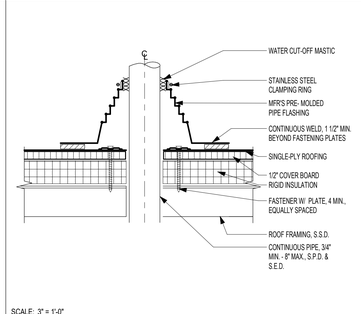
ROOF DRAIN & OVERFLOW SUMP 11



SCALE: 3" = 1'-0"

VENT AT ROOF 6



SCALE: 3" = 1'-0"

ROOF PENETRATION W/ PRE-MOLDED DOME 1

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

CONSULTANT

PALMS PARK COMMUNITY CENTER

12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

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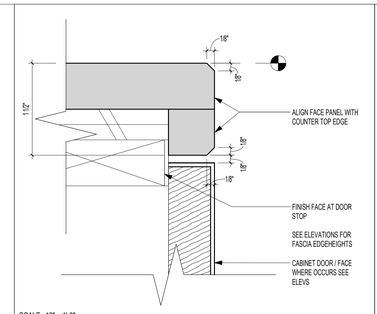
DRAWN Author
CHECK Checker

DETAILS - ROOF PENETRATIONS

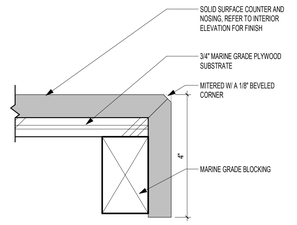
SHEET
A9-41

6/26/2025 4:43:02 PM



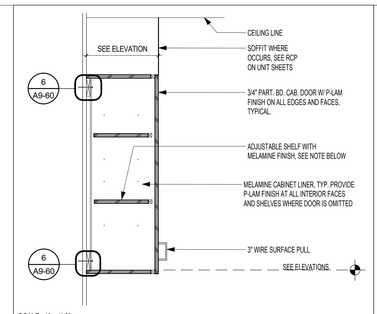
SCALE: 1'2" = 1'-0"

NOSING AT SOLID SURFACE COUNTER 25



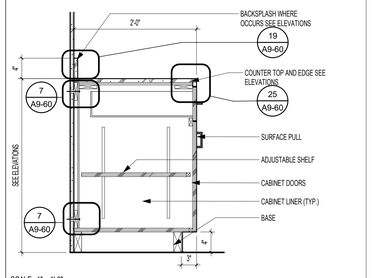
SCALE: 6" = 1'-0"

SOLID SURFACE EDGE 20



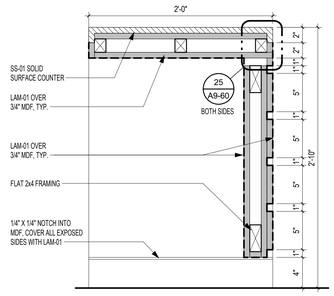
SCALE: 1" = 1'-0"

TYPICAL UPPER CABINET 10



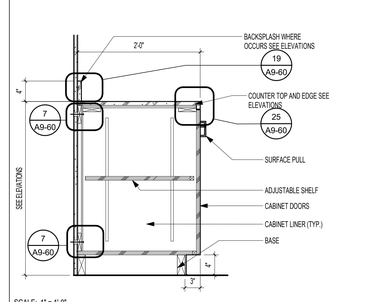
SCALE: 1" = 1'-0"

BASE CABINET - ONE DRAWER 5



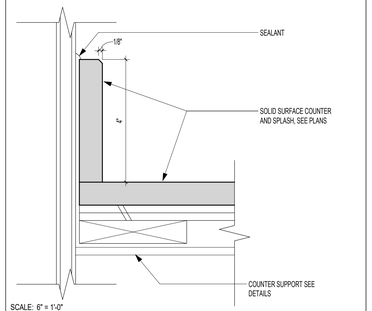
SCALE: 1 1/2" = 1'-0"

OFFICE DESK SECTION 29



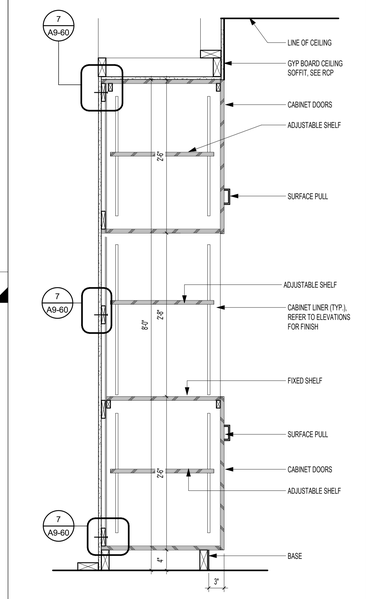
SCALE: 1" = 1'-0"

BASE CABINET 24



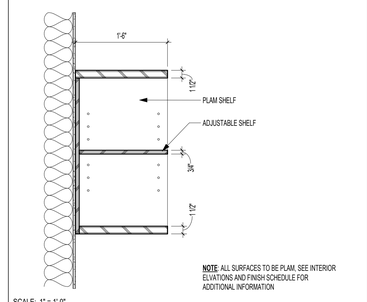
SCALE: 6" = 1'-0"

SPLASH AT SOLID SURFACE COUNTER 19



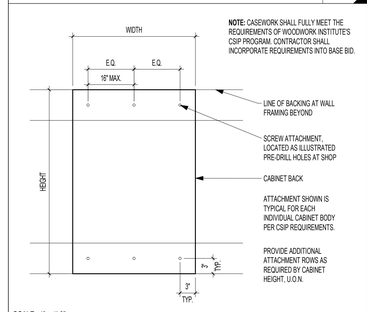
SCALE: 1" = 1'-0"

TALL OPEN STORAGE CABINET 13



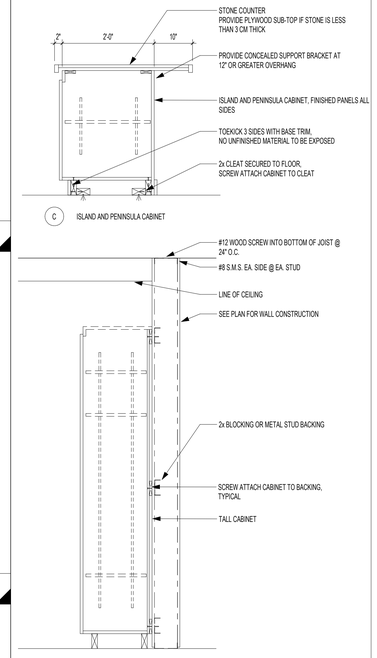
SCALE: 1" = 1'-0"

CABINET SHELVES 9



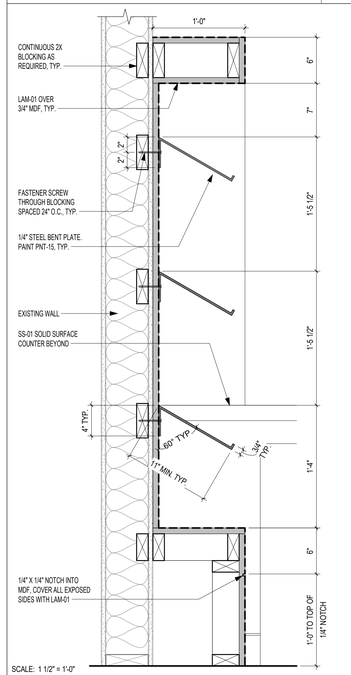
SCALE: 1" = 1'-0"

TYPICAL CABINET BODY ATTACHMENT 8



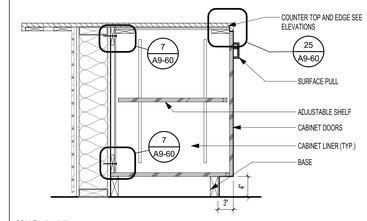
SCALE: 3/4" = 1'-0"

CASEWORK ANCHORAGE 1



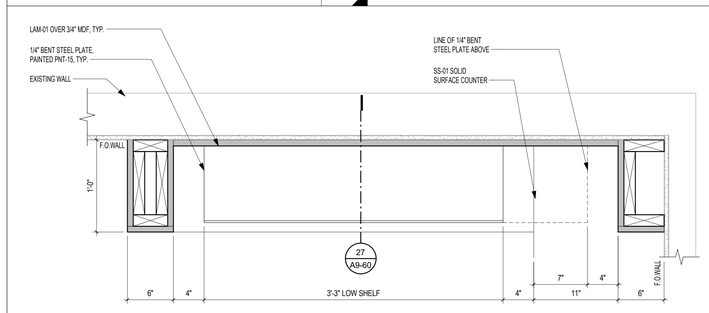
SCALE: 1 1/2" = 1'-0"

MAGAZINE CASEWORK SECTION 27



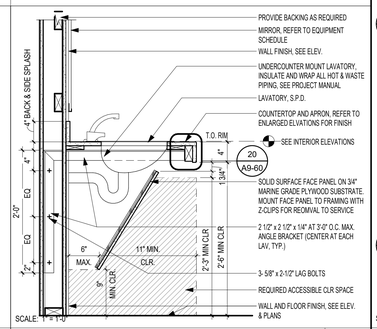
SCALE: 1" = 1'-0"

BASE CABINET @ ROLL UP DOOR 23



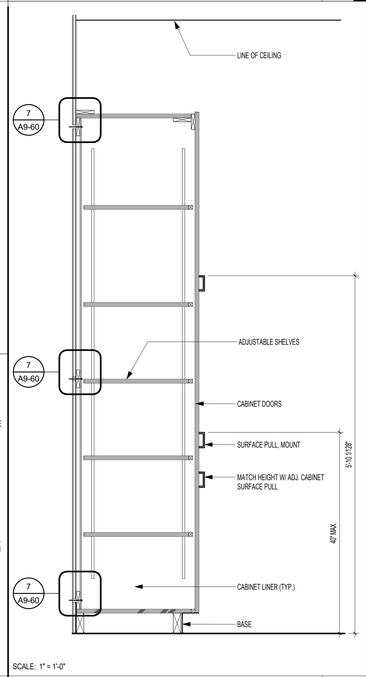
SCALE: 1 1/2" = 1'-0"

MAGAZINE CASEWORK ENLARGED PLAN 21



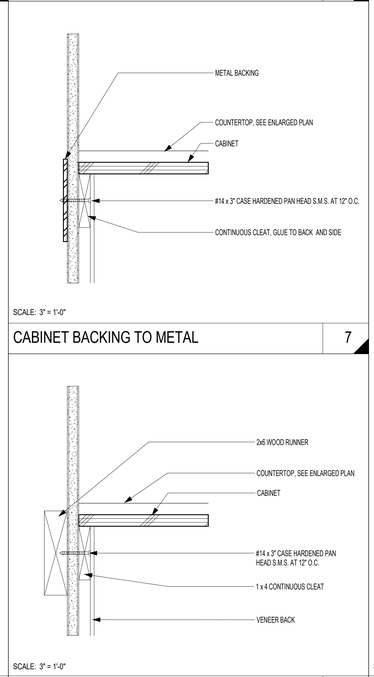
SCALE: 1" = 1'-0"

TYP LAVATORY @ COUNTER 16



SCALE: 1" = 1'-0"

FULL HEIGHT STORAGE CABINET 11

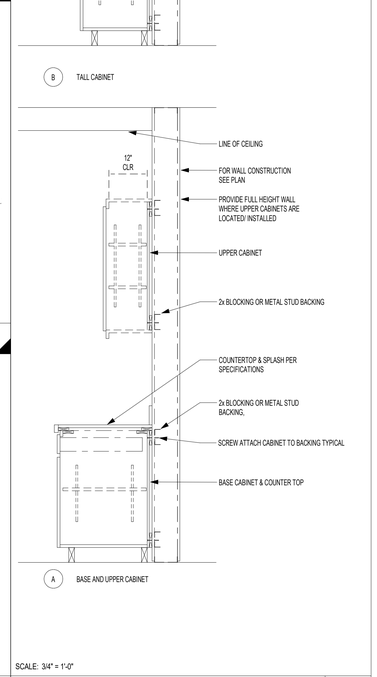


SCALE: 3" = 1'-0"

CABINET BACKING TO METAL 7

SCALE: 3" = 1'-0"

CABINET BACKING TO WOOD 6



SCALE: 3/4" = 1'-0"

CASEWORK ANCHORAGE 1

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CHECK	**Checker**

DETAILS - CASEWORK

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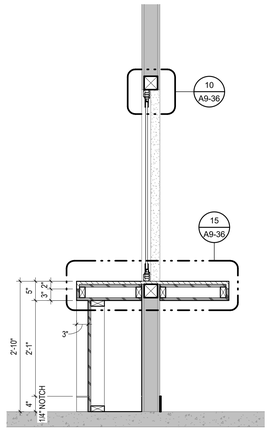
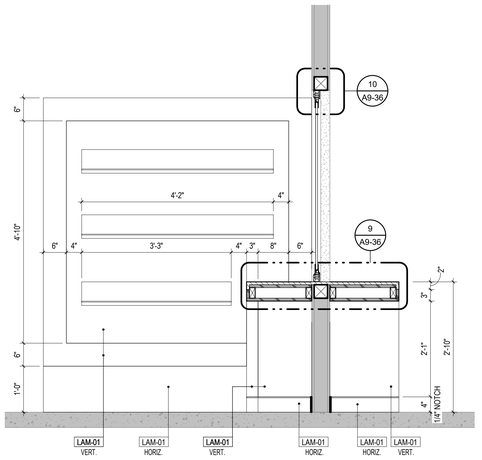
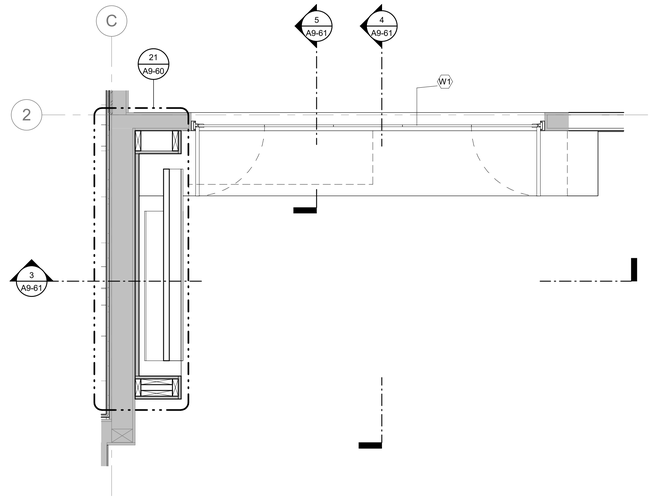


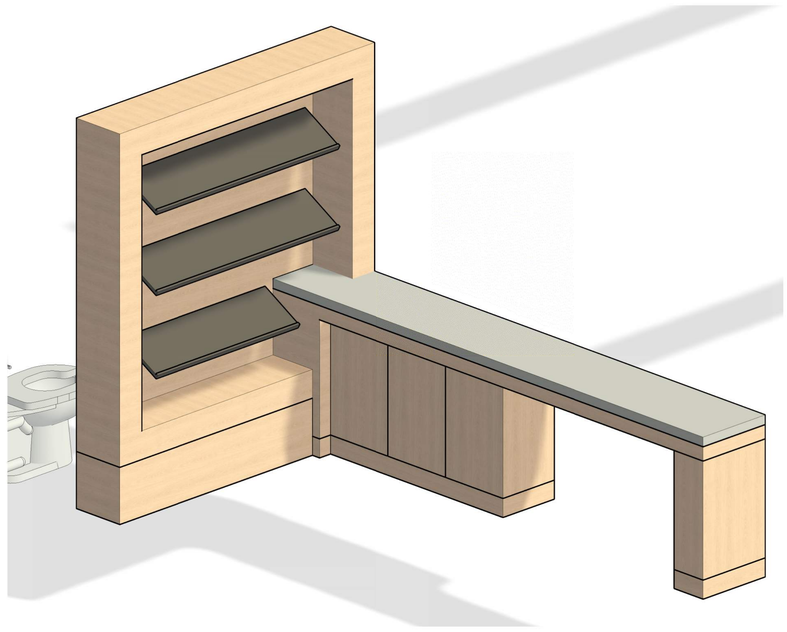
5 LOBBY DESK - SECTION A
3/4" = 1'-0"



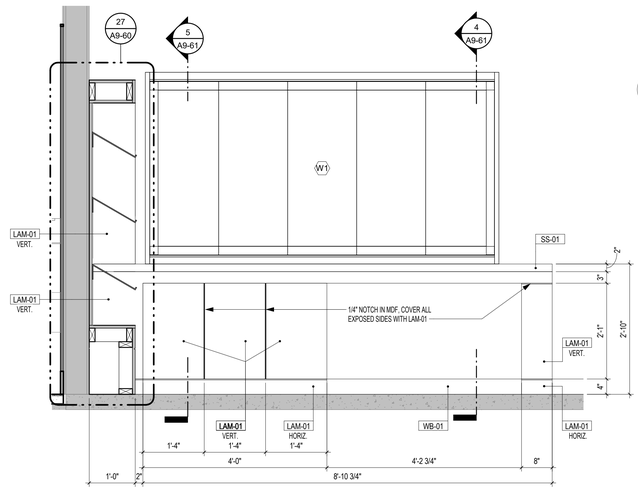
4 LOBBY DESK - SECTION C
3/4" = 1'-0"



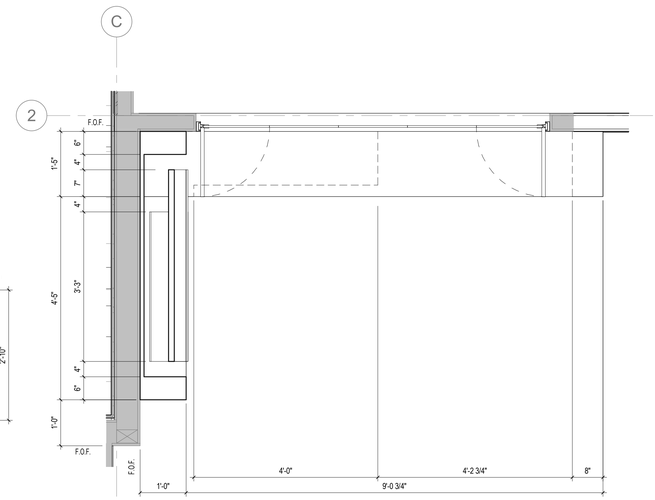
2 ENLARGED ANNO. PLAN - LOBBY DESK
3/4" = 1'-0"



6 LOBBY DESK - FRONT VIEW



3 LOBBY DESK - SECTION B
3/4" = 1'-0"



1 ENLARGED DIMENSION PLAN - LOBBY DESK
3/4" = 1'-0"

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DETAILS - CASEWORK

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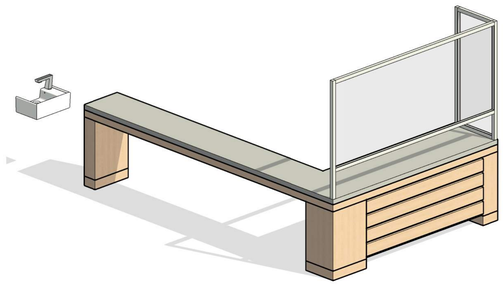
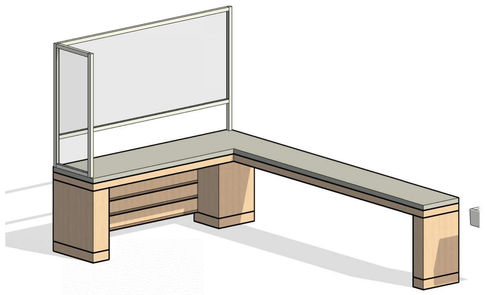
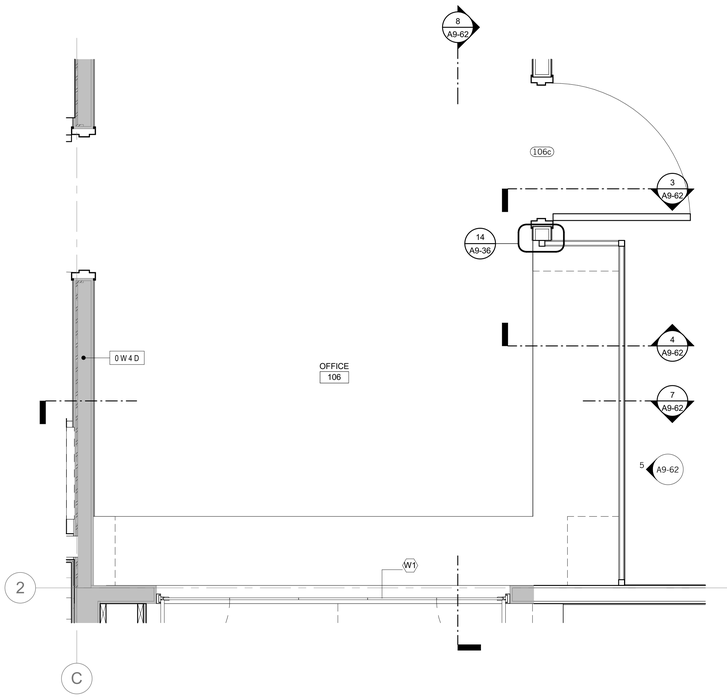


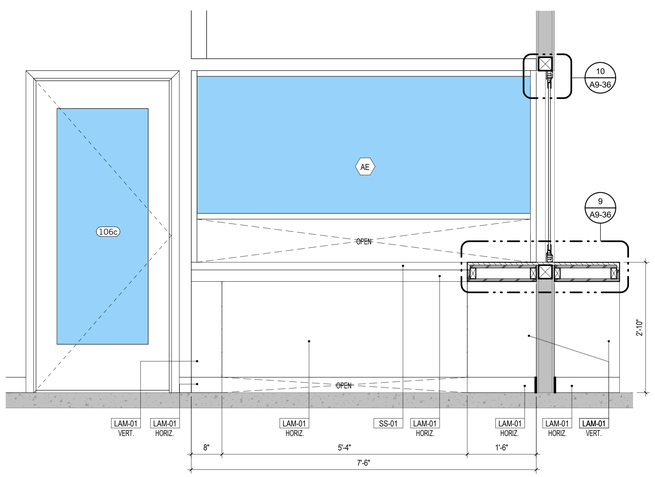
9 OFFICE DESK - FRONT VIEW



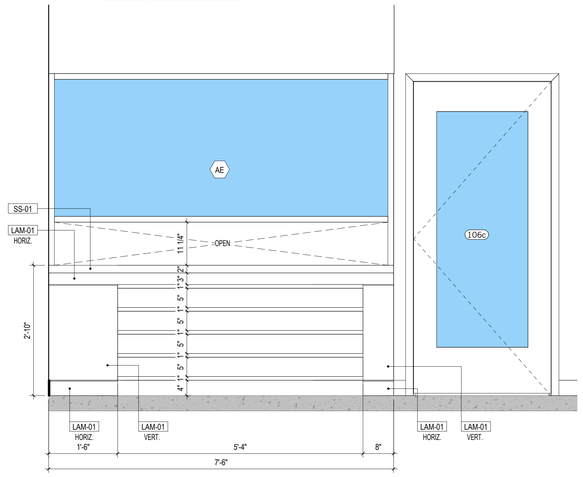
6 OFFICE DESK - REAR VIEW



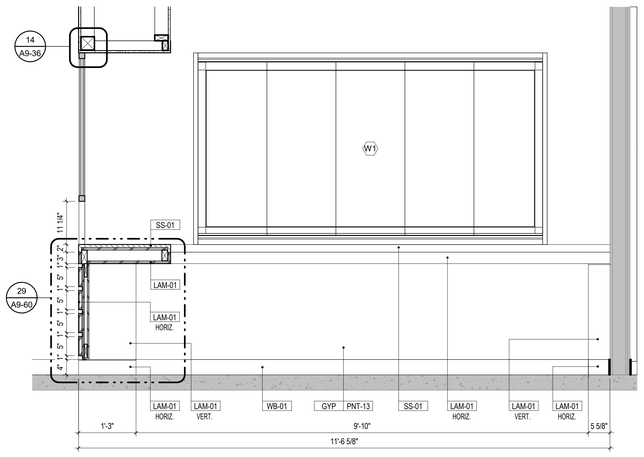
2 ENLARGED ANNO. PLAN - OFFICE DESK
3/4" = 1'-0"



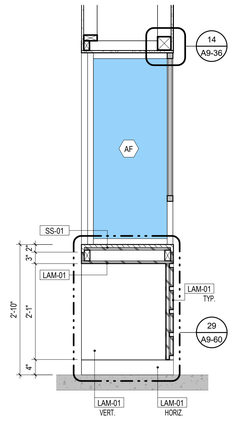
8 OFFICE DESK - SECTION A
3/4" = 1'-0"



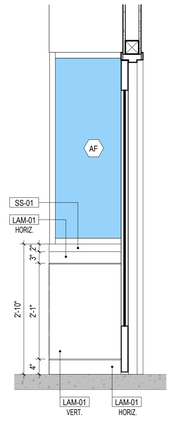
5 OFFICE DESK - SECTION B
3/4" = 1'-0"



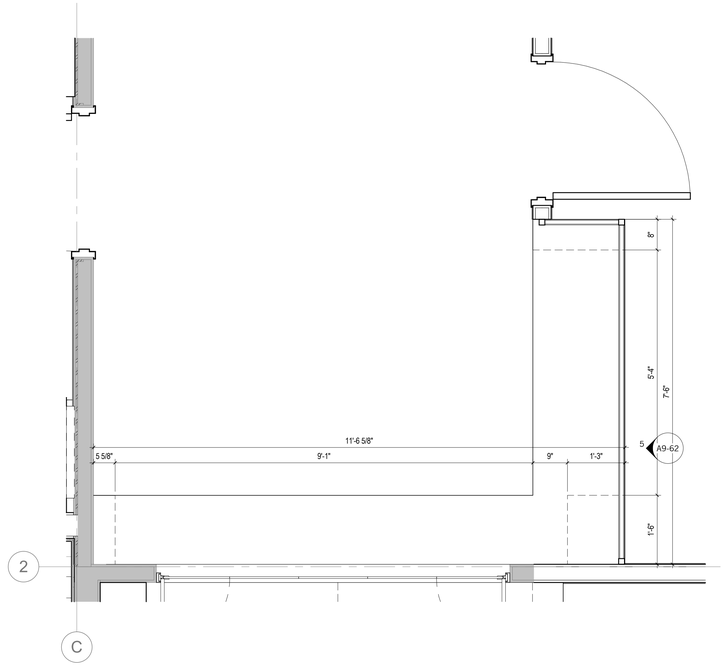
7 OFFICE DESK - SECTION C
3/4" = 1'-0"



OFFICE DESK
SECTION D.
4 3/4" = 1'-0"



OFFICE DESK
SECTION E.
3 3/4" = 1'-0"



1 ENLARGED DIMENSION PLAN - OFFICE DESK
3/4" = 1'-0"

6/26/2025 4:43:37 PM

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JOB NO. **1533.006**
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CHECK **Checker**

DETAILS - CASEWORK

SHEET
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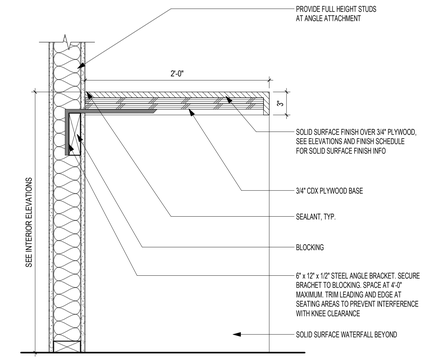
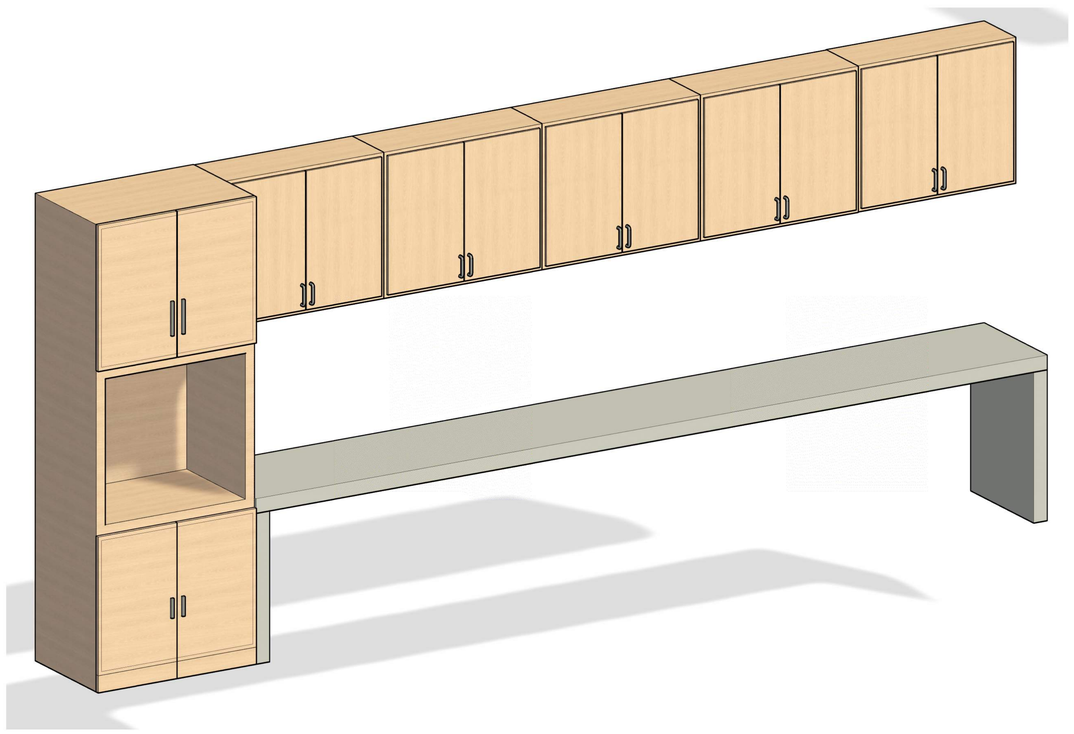
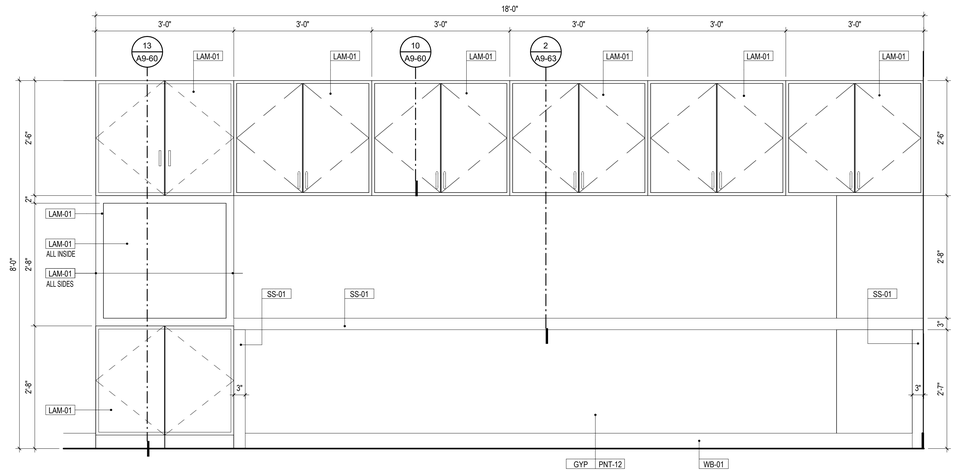


2 YOUTH CENTER COUNTERTOP
1 1/2" = 1'-0"



3 YOUTH CENTER CASEWORK - FRONT VIEW



1 YOUTH CENTER CASEWORK - ELEVATION
3/4" = 1'-0"

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DETAILS - CASEWORK

SHEET
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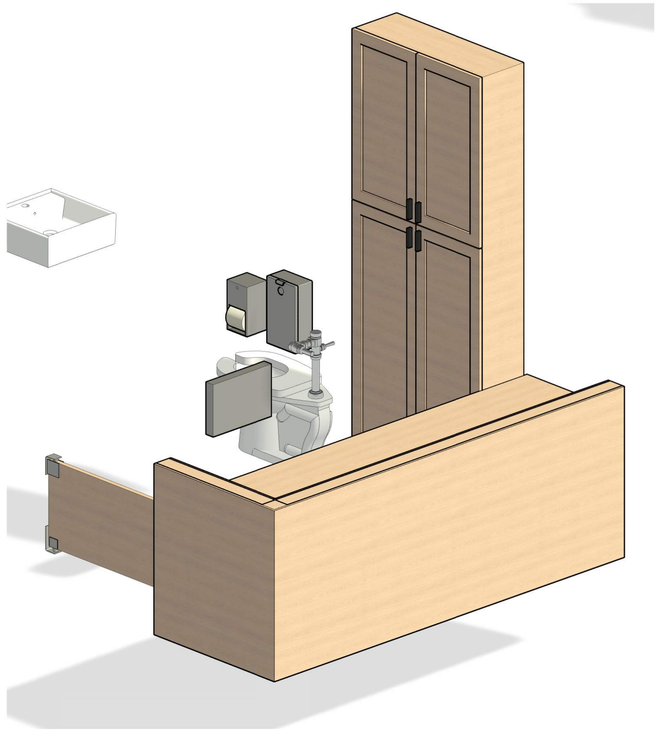
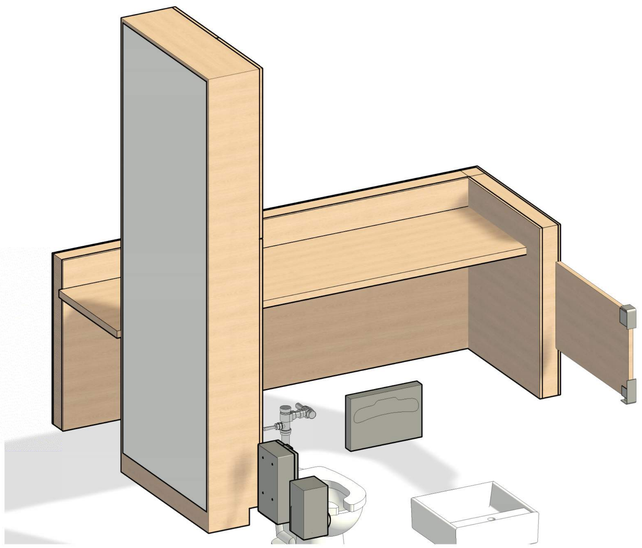
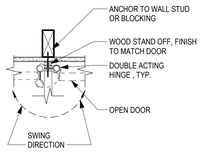
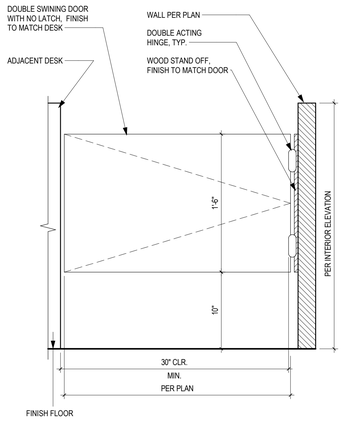


8 GYMNASTIC CHECK-IN DESK - FRONT VIEW

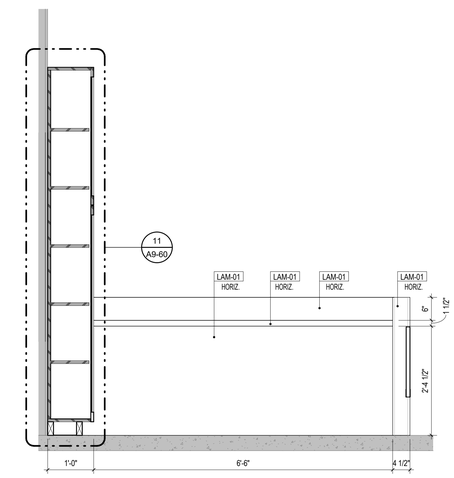


7 GYMNASTIC CHECK-IN DESK - REAR VIEW

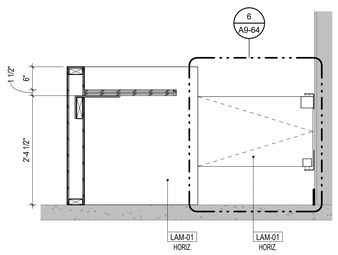




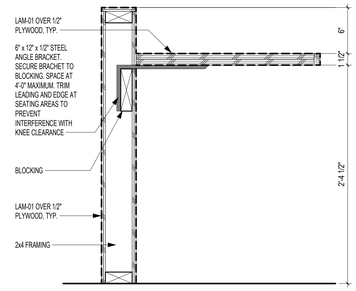
6 DOUBLE ACTING SWING DOOR
1 1/2" = 1'-0"



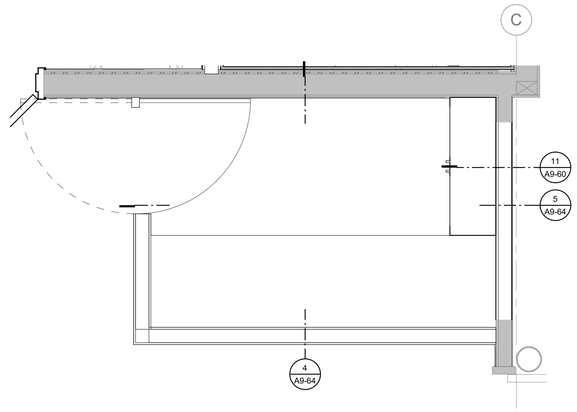
5 GYM. CHECK-IN DESK - SECTION A
3/4" = 1'-0"



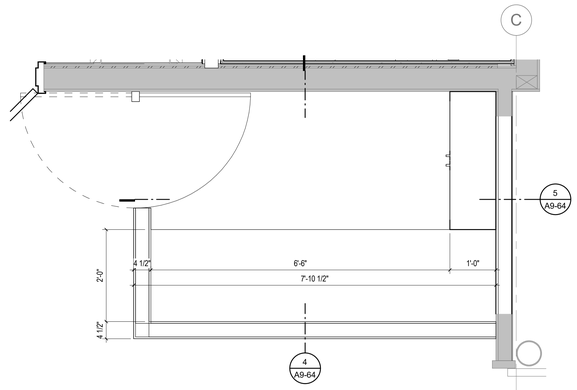
4 GYM. CHECK-IN DESK - SECTION B
3/4" = 1'-0"



3 GYM. CHECK-IN DESK SECTION
1 1/2" = 1'-0"



2 ENLARGED ANNO. PLAN - GYM. CHECK-IN DESK
3/4" = 1'-0"



1 ENLARGED DIMENSION PLAN - GYM. CHECK-IN DESK
3/4" = 1'-0"

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DRAWN	**Author**
CHECK	**Checker**

DETAILS - CASEWORK

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STRUCTURAL - GENERAL NOTES

GENERAL REQUIREMENTS

GOVERNING CODE: The design and construction of this project is governed by the **"California Building Code (CBC)", 2022 Edition**, hereafter referred to as the IBC, as adopted and modified by the City of **Lakewood** understood to be the Authority Having Jurisdiction (AHJ).

REFERENCE STANDARDS: **Refer to Chapter 35 of 2022 IBC**. Where other Standards are noted in the drawings, use the latest edition of the standard unless a specific date is indicated. Reference to a specific section in a code does not relieve the contractor from compliance with the entire standard.

DEFINITIONS: The following definitions cover the meanings of certain terms used in these notes:

"**Architect/Engineer**" – The Architect of Record and the Structural Engineer of Record.

- "**Structural Engineer of Record**" **(SER)** – The structural engineer who is licensed to stamp & sign the structural documents for the project. The SER is responsible for the design of the Primary Structural System.
- "**Submit for review**" - Submit to the Architect/SER for review prior to fabrication or construction.
- "**Per Plan**" – Indicates references to the structural plans, elevations and structural general notes.
- "**Seismic Force Resisting System (SFRS)**" **–** A recognized structural system of components (beams, braces, drags, struts, collectors, diaphragms, columns, walls, etc) of the primary structure that are specially designed and proportioned to resist earthquake-induced ground motions and maintain stability of the structure. Fabrication and installation of components designated as part of the SFRS require the general contractor, subcontractor, or supplier who is responsible for any portion of SFRS fabrication or installation to comply with special requirements (including, but not limited to, material control, compliance certifications, personnel qualifications, documentation, reporting requirements, etc) and to provide the required Quality Control including the required coordination of Special Inspections (Quality Assurance – QA). Special provisions apply to any member designated as part of the SFRS. Refer to plans, elevations, details, Design Criteria and Symbols and Legends for applicable members and connections.
-

SPECIFICATIONS: Refer to the project specifications issued as part of the contract documents for information supplemental to these drawings.

OTHER DRAWINGS: Refer to the architectural, mechanical, electrical, civil and plumbing drawings for additional information including but not limited to: dimensions, elevations, slopes, door and window openings, non-bearing walls, stairs, finishes, drains, waterproofing, railings, unit locations, and other nonstructural items.

STRUCTURAL DETAILS: The structural drawings are intended to show the general character and extent of the project and are not intended to show all details of the work. Use entire detail sheets and specific details referenced in the plans as "typical" wherever they apply. Similarly, use details on entire sheets with "typical" in the name wherever they apply.

STRUCTURAL RESPONSIBILITIES: The structural engineer (SER) is responsible for the strength and stability of the primary structure in its completed form.

COORDINATION: The Contractor is responsible for coordinating details and accuracy of the work; for confirming and correlating all quantities and dimensions; for selecting fabrication processes; for techniques of assembly; and for performing work in a safe and secure manner.

EXISTING CONDITIONS: Information shown on the drawings related to existing conditions represent the present knowledge, but without guarantee of accuracy. Report conditions that conflict with contract documents to the architect or SER. Do not deviate from the contract documents without written direction from the architect and/or SER. All existing dimensions and information shall be field verified prior to fabrication as required to coordinate with new construction.

NEW CONSTRUCTION: The contractor shall remove all interfering items for new construction and shall repair or replace all removed items to match the existing conditions in accordance with the architectural drawings. New construction elements shall be designed and installed per current International Building Code 2018, hereafter referred to as IBC as allowed by IEBC.

MEANS, METHODS and SAFETY REQUIREMENTS: The contractor is responsible for the means and methods of construction and all job related safety standards such as OSHA and DOSH (Department of Occupational Safety and Health). Contractor is responsible to adhere to OSHA regulations regarding steel erection items specifically addressed in the latest OSHA regulations. Bolting and field welding at all member connections is to be completed prior to the release of the member from the hoisting mechanism unless reviewed and approved by the General Contractor's temporary bracing and shoring design engineer. The construction documents represent the completed structure. The contractor is responsible for means and methods of construction related to the intermediate structural conditions (i.e. movement of the structure due to moisture and thermal effects; construction sequence; temporary bracing, etc).

CONSTRUCTION LOADS: Loads on the structure during construction shall not exceed the design loads as noted in DESIGN CRITERIA & LOADS below or the capacity of partially completed construction as determined by the Contractor's SSE for Bracing/Shoring.

CHANGES IN LOADING: The contractor has the responsibility to notify the SER of any architectural, mechanical, electrical, or plumbing load imposed onto the structure that differs from, or that is not documented on the original Contract Documents (architectural / structural / mechanical / electrical or plumbing drawings). Provide documentation of location, load, size and anchorage of all undocumented loads in excess of **400** pounds. Provide marked-up structural plan indicating locations of any new equipment or loads. Submit plans to the Architect/Engineer for review prior to installation.

NOTE PRIORITIES: Plan and detail notes and specific loading data provided on individual plans and detail drawings supplements information in the Structural General Notes.

DISCREPANCIES: In case of discrepancies between the General Notes, Specifications, Plans/Details or Reference Standards, the Architect/Engineer shall determine which shall govern. Discrepancies shall be brought to the attention of the Architect/Engineer before proceeding with the work. Should any discrepancy be found in the Contract Documents, the Contractor will be deemed to have included in the price the most expensive way of completing the work, unless prior to the submission of the price, the Contractor asks for a decision from the Architect as to which shall govern. Accordingly, any conflict in or between the Contract Documents shall not be a basis for adjustment in the Contract Price.

ALTERNATES: Alternate products of similar strength, nature and form for specified items may be submitted with adequate technical documentation (proper test report, etc.) to the Architect/Engineer for review. Alternate materials that are submitted without adequate technical documentation or that significantly deviate from the design intent of materials specified may be returned without review. Alternates that require substantial effort to review will not be reviewed unless authorized by the Owner.

NARRATIVE: The following items will be repaired, modified, or added for this project:

1.) Foundations
2.) Stud and shear walls
3.) Storefront
4.) Roof Framing

ADDITIONS/ALTERATIONS/REPAIRS: Additions, alterations, and/or repairs to the existing structure has been analyzed for additional loading and/or modification due to the addition, the alteration or the repair. All affected existing member have been analyzed or reinforced as required per IEBC.

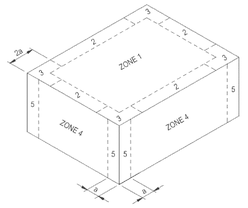
All Demolition or removal of architectural, mechanical or structural elements shall not damage structural items to remain.

DESIGN CRITERIA AND LOADS

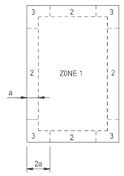
OCCUPANCY:	Risk Category of Building per 2018 IBC Table 1604.5 =	**II**

WIND DESIGN:	**MAIN WIND FORCE RESISTING SYSTEM**		
	Ultimate Design Wind Speed, V_{ULT} (MPH)		**110**
	Exposure Category		**C**
	Internal Pressure Coefficient	**Cpi =**	**+/- 0.18**
	Topographic Factor	**Kzt =**	**1.0**
	Wind Analysis procedure used:		**Envelope**

WIND DESIGN: COMPONENTS & CLADDING PRESSURES FOR DESIGN (PSF, ULTIMATE)



ISOMETRIC VIEW



PLAN VIEW

EFFECTIVE WIND AREA (SQ. FT)

a = XX'-XX"	10	20	50	100	500
ZONE 1	-33.3	-31.1	-28.2	-26.0	-20.9
ZONE 2	-43.9	-41.1	-37.4	-34.5	-28.0
ZONE 3	-43.9	-41.1	-37.4	-34.5	-28.0
ZONE 4	-20.7, 19.1	-19.9, 18.3	-18.8, 17.2	-17.9, 16.3	-16.0, 16.0
ZONE 5	-25.5, 19.1	-23.8, 18.3	-21.6, 17.2	-19.9, 16.3	-16.0, 16.0

1) Components and Cladding Wind Pressures are based on ASCE 7-16 Chapter 30 Part 3: Buildings with h > 60 ft.
2) Components and Cladding zone locations are based on ASCE 7-16 Table 30.5-1 for Flat Roofs Θ < 10 deg.
3) For parapets around the perimeter of the roof equal to or higher than 3 ft, Zone 3 shall be treated as Zone 2.
4) All Parapet Components and Cladding Wind Pressures shall be determined through ASCE 7-16 Figure 30.6-2.

SEISMIC DESIGN:	**Seismic Design Category:**	**SDC =** **D**
		Bearing Wall
	Basic Structural System	
	Seismic Force Resisting System	**Wood Shear Walls**
	Response Modification Factor:	**R =** **6**
	System Over Strength Factor	**Omega =** **2.5**
	Deflection Amplification Factor	**Cd =** **4**
	Site Classification per IBC 1613.3.2 & ASCE 7-16, Ch. 20 **Site Class =**	**D**
	Seismic Importance Factor per ASCE 7-16 Table 1.5-2	**Ie =** **1.0**
	Spectral Response Acceleration (Short Period)	**S_s =** **1.504 g**
	Spectral Response Acceleration (1-Second Period)	**S_1 =** **0.535 g**
	Spectral Design Response Coefficient (Short Period)	**S_{DS} =** **1.003 g**
	Spectral Design Response Coefficient (1-Second Period)	**S_{D1} =** **0.330 g**
	Seismic response coefficient(s)	**Cs =** **0.18**
	Redundancy Factor (North/South Direction)	**N/S rho=** **1.0**
	Redundancy Factor (East / West Direction)	**E/W rho=** **1.0**
	Design Base Shear (North/South Direction) (KIPS)	**404**
	Design Base Shear (East / West Direction) (KIPS)	**404**
	Base shear governed by:	**seismic**
	Seismic Analysis procedure used:	**Equivalent Lateral Force (ELF)**

DESIGN LIVE LOADS	**AREA**	**LIVE LOADS (PSF) UNO**	**REMARKS & FOOTNOTES** (6)
	Handrails & Pedestrian Guardrails	50 PLF or 200 LB	(1)
	Stairs & Exits	100 PSF or 300 LB	Stair treads per note (2)

(1) Top rail shall be designed to resist 50 PLF line load or 200 lb point load applied in any direction at any point. Intermediate rails (all those except the handrail), balusters and panel fillers shall be designed to withstand a horizontally applied normal load of 50 LB on an area not to exceed 1 ft square. These three loads are to be considered separately with worst case used for design.
(2) Unless otherwise noted, point loads to be distributed over a 2.5ft x 2.5ft area and located to produce maximum load effects on structural members.

SUBMITTALS

SUBMIT FOR REVIEW: SUBMITTALS of shop drawings, and product data and mill tests are required for items noted in the individual materials sections and for *bidder designed* elements.

SUBMITTAL REVIEW PERIOD: Submittals shall be made in time to provide a minimum of TWO WEEKS or 10 WORKING DAYS for review by the Architect/Engineer prior to the onset of fabrication.

GENERAL CONTRACTOR'S PRIOR REVIEW: Prior to submission to the Architect/Engineer, the Contractor shall review the submittal for completeness. Dimensions and quantities are not reviewed by the SER, and therefore, must be verified by the General Contractor. Contractor shall provide any necessary dimensional details requested by the Detailer and provide the Contractor's review stamp and signature before forwarding to the Architect/Engineer.

SHOP DRAWING REVIEW: Once the contractor has completed their review, the SER will review the submittal for general conformance with the design concept and the contract documents of the building and will stamp the submittal accordingly. Markings or comments shall not be construed as relieving the contractor from compliance with the project plans and specifications, nor departures there from. The SER will return submittals in the form they are submitted in (either hard copy or electronic). For hard copy submittals, the contractor is responsible for submitting the required number of copies to the SER for review.

SHOP DRAWING DEVIATIONS: When shop drawings (component design drawings) differ from or add to the requirements of the structural drawings they shall be designed and stamped by the responsible SSE.

DEFERRED SUBMITTALS

BIDDER-DESIGNED ELEMENTS
Submit "Bidder-Designed" deferred submittals to the Architect and SER for review. The deferred submittals shall also be submitted to the city for approval, if required by the city.

Design of prefabricated, "bidder designed", manufactured, pre-engineered, or other fabricated products shall comply with the following requirements:
1) Design considers tributary dead, live, wind and earthquake loads in combinations required by IBC.
2) Design within the Deflection Limits noted herein and as specified or referenced in the IBC.
3) Design shall conform to the specifications and reference standards of the governing code.
4) Submittal shall include:
   a. Calculations prepared, stamped and signed by the SSE demonstrating code conformance.
   b. Engineered component design drawings are prepared, stamped and signed by the SSE.
   c. Product data, technical information and manufacturer's written requirements and Agency approvals as applicable.
   d. SSE may submit to the Architect/Engineer, a request to utilize relevant alternate design criteria of similar nature and generally equivalency which is recognized by the Code and acceptable to the Authority Having Jurisdiction. Submit adequate documentation of design.

DEFLECTION LIMITS FOR SSE / BIDDER	**VERTICAL**	**LIMIT**
	Roof Members, Dead + Live or Snow or Wind, Total Load (TL) Deflection	L / 240, where (L is span length,inches)
DESIGNED	Roof, Live or Snow or Wind Load (RLL)	L / 360
	SIP Panel Live Load Deflection	L / 360
	HORIZONTAL	**LIMIT and FOOTNOTE**
	Interstory Drift	0.020 x Story Height

(1) Wind Load is reducible to 0.42 times the Component and Cladding Loads per Table 1604.3 footnote f.

GENERAL CONTRACTOR'S PRIOR REVIEW: Once the contractor has completed their review of the SSE component drawings, the SER will review the submittal for general conformance with the design of the building and will stamp the submittal accordingly. Review of the Specialty Structural Engineer's (SSE) shop drawings (component design drawings) is for compliance with design criteria and compatibility with the design of the primary structure and does not relieve the SSE of responsibility for that design. All necessary bracing, ties, anchorage, proprietary products shall be furnished and installed per manufacturer's instructions or the SSE's design drawings and calculations. These elements include but are not limited to:

- Exterior Cladding Systems: Curtain Wall Systems, Pre-engineered Panels
- Roof Mounted Components: Skylights, hatches
- Solid Web Wood Joists
- Engineered Wood Products, (PSL, LSL, LVL)
- Façade Access Equipment / Lifeline Supports

INSPECTIONS, QUALITY ASSURANCE VERIFICATIONS AND TEST REQUIREMENTS

INSPECTIONS: Foundations, footings, under slab systems and framing are subject to inspection by the Building Official in accordance with IBC 110.3. Contractor shall coordinate all required inspections with the Building Official.

SPECIAL INSPECTIONS, VERIFICATIONS and TESTS: Special Inspections, Verifications and Testing shall be done in accordance with IBC Chapter 17, the STATEMENT AND SCHEDULES OF SPECIAL INSPECTIONS listed in these drawings, and the AHJ STATEMENT OF SPECIAL INSPECTION.

STRUCTURAL OBSERVATION: per IBC Section 1704.6

Structural Observation is the visual observation of the structural system by a registered design professional for general conformance to the approved construction documents. It is not always required on a project, does not include or waive the responsibility for the special inspections and tests required by a Special Inspector per IBC Chapter 17, is not continuous, and does not certify conformance with the approved construction documents.

Structural Observation for this project is required per IBC Section 1704.6. Contractor shall notify the SER in a timely manner to allow required Structural Observations to occur. Reports will be distributed to the Architect, the Contractor, Special Inspector and the Authority Having Jurisdiction.

The frequency and extent of observations is at the discretion of the structural observer. Only significant stages of construction identified by the Structural Observer require observation. For repetitive or similar structural elements identified as significant, only the first element of a stage requires observation unless noted otherwise. The following significant stages of construction require observation: prior to foundation concrete placement, during stud and shear wall construction, and after roof diaphragm is complete prior to roofing.

CONTRACTOR RESPONSIBILITY: Prior to issuance of the building permit, the Contractor is required to provide the Authority Having Jurisdiction a signed, written acknowledgement of the Contractor's responsibilities associated with the above Statement of Special Inspections addressing the requirements listed in IBC Section 1704.4. Contractor is referred to IBC Sections 1705.12.5 and 1705.12.6 for architectural and MEP building systems that may be subject to additional inspections (based on the building's designated Seismic Design Category listed in the CRITERIA), including anchorage of HVAC ductwork containing hazardous materials, piping systems and mechanical units containing flammable, combustible or highly toxic materials, electrical equipment used for emergency or standby power, exterior wall panels and suspended ceiling systems.

SOILS AND FOUNDATIONS

REFERENCE STANDARDS: Conform to IBC Chapter 18 "Soils and Foundations."

GEOTECHNICAL REPORT: Recommendations contained in "REPORT OF GEOTECHNICAL INVESTIGATION Proposed Palms Park Community Center Building Addition 12305 207th Street City of Lakewood, California" by **Associated Soils Engineering** dated **January 20, 2023** were used for design.

CONTRACTOR'S RESPONSIBILITIES: Contractor shall be responsible to review the Geotechnical Report and shall follow the recommendations specified therein including, but not limited to, subgrade preparations, pile installation procedures, ground water management and steep slope Best Management Practices."

GEOTECHNICAL SUBGRADE INSPECTION: The Geotechnical Engineer shall inspect all sub-grades and prepared soil bearing surfaces, prior to placement of foundation reinforcing steel and concrete. Geotechnical Engineers shall provide a letter to the owner stating that soils are adequate to support the "Allowable Foundation Bearing Pressure(s)" shown below. Assumed values shall be field verified by the Building Official or the Geotechnical Engineer prior to placing concrete.

DESIGN SOIL VALUES:

Safety Factor per Soils Report	1.5	
Allowable Foundation Bearing Pressure	1600	PSF – Structural Fill
Passive Lateral Pressure	150	PSF/FT
Coefficient of Sliding Friction	0.40	

FOUNDATIONS and FOOTINGS: Foundations shall bear on compacted structural fill as per the geotechnical report. Exterior perimeter footings shall bear not less than 12 inches below finish grade, unless otherwise specified by the geotechnical engineer and/or the building official.

FOOTING DEPTH: Tops of footings shall be as shown on plans with vertical changes as indicated with steps in the footings; locations of steps shown as approximate and shall be coordinated with the civil grading plans.

SLABS-ON-GRADE: All slabs-on-grade shall bear on compacted structural fill or competent native soil per the geotechnical report. All moisture sensitive slabs-on-grade or those subject to receive moisture sensitive coatings/covering shall be provided with an appropriate capillary break and vapor barrier/retardant over the subgrade prepared and installed as noted in the geotechnical report, barrier manufacturer's written recommendations and coordinated with the finishes specified by the Architect.

CAST-IN-PLACE CONCRETE

REFERENCE STANDARDS: Conform to:
(1) ACI 301-16 "Specifications for Structural Concrete"
(2) IBC Chapter 19 "Concrete"
(3) ACI 318-14 "Building Code Requirements for Structural Concrete"
(4) ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

FIELD REFERENCE: The contractor shall keep a copy of ACI Field Reference manual, SP-15, "Standard Specifications for Structural Concrete (ACI 301) with Selected ACI and ASTM References."

CONCRETE MIXTURES: Conform to ACI 301 Section 4 "Concrete Mixtures" and IBC Section 1904.1.

MATERIALS: Conform to ACI 301 Section 4.2.1 "Materials" for requirements for cementitious materials, aggregates, mixing water and admixtures.

SUBMITTALS: Provide all submittals required by ACI 301 Section 4.1.2. Submit mix designs for each mix in the table below. Substantiating strength results from past tests shall not be older than 24 months per ACI 318 Section 26.4.3.1 (b).

TABLE OF MIX DESIGN REQUIREMENTS

Member Type/Location	Strength f'c (psi)	Test Age (days)	Nominal Maximum Aggregate	Exposure Class	Max W/C Ratio	Air Content	Notes (1 to 9 Typical UNO)
Footings	4000	28	1"	-	-	-	-
Exterior Slabs on Grade & Sidewalks	3000	28	1"	-	0.45	5%	-
Interior Slabs on Grade	3000	28	1"	-	0.50	-	10
Stem Walls & Curbs	4000	28	1"	-	-	-	-
Exterior Stem Walls & Curbs	4500	28	1"	F2	0.45	6%	-

Table of Mix Design Requirements Notes:

(1) W/C Ratio: Water–cementitious material ratios shall be based on the total weight of cementitious materials. Maximum ratios are controlled by strength noted in the Table of Mix Design Requirements and durability requirements given in ACI 318 Section 19.3.

(2) Cementitious Materials:
   a. DCI encourages the reduction of cement content and/or the use of blended hydraulic cements. Where requirements of this section prohibit inclusion of any of these mixes, contact DCI for further coordination.
   b. The use of fly ash, other pozzolans, silica fume, or slag shall conform to ACI 318 Sections 19.3.2 and 26.4.2.2. Maximum amount of fly ash shall be 25% of total cementitious content unless reviewed and approved by SER.
   c. Cementitious materials shall conform to the relevant ASTM standards listed in ACI 318 Section 26.4.1.1.1(a).

(3) Air Content: Conform to ACI 318 Section 19.3.3.1. Minimum standards for exposure class are noted in the table. If freezing and thawing class is not noted, air content given is that required by the SER. Tolerance is ±1-½%. Air content shall be measured at point of placement.

(4) Aggregates shall conform to ASTM C33.

(5) Slump: Conform to ACI 301 Section 4.2.2.2. Slump shall be determined at point of placement.

(6) Chloride Content: Conform to ACI 318 Table 19.3.2.1.

(7) Non- chloride accelerator: Non-chloride accelerating admixture may be used in concrete placed at ambient temperatures below 50°F at the contractor's option.

(8) ACI 318, Section 19.3.1.1 exposure classes shall be assumed to be **S0** unless different exposure classes are listed in the Table of Mix Design Requirements that modify these base requirements.

(9) Shrinkage Limit: Concrete used in slab-on-grade shall have a shrinkage limit of 0.040% when exposed or used in industrial applications and a shrinkage limit of 0.045% for all other conditions and applications. Submit laboratory test results at 28 days measured in accordance with ASTM C157 to SER for approval prior to construction.

FORMWORK & RESHORING: Conform to ACI 301 Section 2 "Formwork and Form Accessories." Removal of Forms shall conform to Section 2.3.2 except strength indicated in Section 2.3.2.5 shall be 0.75 f' c.

MEASURING, MIXING, AND DELIVERY: Conform to ACI 301 Section 4.3.

HANDLING, PLACING, CONSTRUCTING AND CURING: Conform to ACI 301 Section 5. In addition, hot weather concreting shall conform to ACI 305R-10 and cold weather concreting shall conform to ACI 306R-10.

CONSTRUCTION JOINTS: Conform to ACI 301 Sections. 2.2.2.5 and 5.3.2.6. Construction joints shall be located and detailed as on the construction drawings. Submit alternate locations per ACI 301 Section 5.1.2.4(a) for review and approval by the SER two weeks minimum prior to forming. Use of an acceptable adhesive, surface retardant, portland cement grout or roughening the surface is not required unless specifically noted on the drawings.

EMBEDDED ITEMS: Position and secure in place expansion joint material, anchors and other structural and non-structural embedded items before placing concrete. Contractor shall refer to mechanical, electrical, plumbing and architectural drawings and coordinate other embedded items.

GROUT: Use 7000 psi non-shrink grout.

POST-INSTALLED ANCHORS to CONCRETE: Anchor location, type, diameter and embedment shall be as indicated on drawings. Reference the POST INSTALLED ANCHORS section for applicable Post-Installed Anchor Adhesives. Anchors shall be installed and inspected in strict accordance with the applicable ICC-Evaluation Service Report (ESR). Special inspection shall be per the TESTS and INSPECTIONS section.

SHRINKAGE: Conventional and post-tensioned concrete slabs will continue to shrink after initial placement and stressing of concrete. Contractor and subcontractor shall coordinate jointing and interior material finishes to provide adequate tolerance for expected structural frame shrinkage and shall include, but not be limited to: curtain wall, dryvit, storefront, skylight, floor finish, and ceiling suppliers. Contact Engineer for expected range of shrinkage.

STRENGTH TESTING AND ACCEPTANCE:

Testing: Obtain samples and conduct tests in accordance with ACI 301 Section 1.6.3.2. Additional samples may be required to obtain concrete strengths at alternate intervals than shown below.

- Cure 4 cylinders for 28-day test age test 1 cylinder at 7 days, test 2 cylinders at 28 days, and hold 1 cylinder in reserve for use as the Engineer directs. After 56 days, unless notified by the Engineer to the contrary, the reserve cylinder may be discarded without being tested for specimens meeting 28-day strength requirements.
- The number of cylinders indicated above reference 6 by 12 in cylinders. If 4 by 8 in cylinders are to be used, additional cylinders must be cured for testing of 3 cylinders at test age per the table of mix design requirements.

Acceptance. Strength is satisfactory when:

(1) The averages of all sets of 3 consecutive tests equal or exceed the specified strength.

(2) No individual test falls below the specified strength by more than 500 psi.

A "test" for acceptance is the average strength of two 6 by 12 in. cylinders or three 4 by 8 in. cylinders tested at the specified test age.

CONCRETE PLACEMENT TOLERANCE: Conform to ACI 117-10 for concrete placement tolerance.

CONCRETE REINFORCEMENT

REFERENCE STANDARDS: Conform to:
(1) ACI 301-16 "Standard Specifications for Structural Concrete", Section 3 "Reinforcement and Reinforcement Supports."
(2) ACI SP-66(04) "ACI Detailing Manual"
(3) CRSI MSP-09, 28th Edition, "Manual of Standard Practice."
(4) ANSI/AWS D1.4: 2005, "Structural Welding Code - Reinforcing Steel."
(5) IBC Chapter 19-Concrete.
(6) ACI 318-14 "Building Code Requirements for Structural Concrete."
(7) ACI 117-10 "Specifications for Tolerances for Concrete Construction and Materials"

SUBMITTALS: Conform to ACI 301 Section 3.1.2 "Submittals." Submit placing drawings showing fabrication dimensions and placement locations of reinforcement and reinforcement supports.

MATERIALS:

Reinforcing Bars	ASTM A615, Grade 60, deformed bars. ASTM A706, Grade 60, deformed bars.
Epoxy Coated Reinforcing Bars	ASTM A775 or A934
Smooth Welded Wire Fabric	ASTM A1064
Deformed Welded Wire Fabric	ASTM A1064
Bar Supports	CRSI MSP-09, Chapter 3 "Bar Supports."
Tie Wire	16 gage or heavier, black annealed.
Stud Rails	ASTM A1044
Headed Deformed Bars	ASTM A970

EARTHQUAKE REQUIREMENTS: Longitudinal Bars shall conform to ASTM A706, Grade 60 or shall conform to the following requirements:
(1) Welding: Welding is not permitted except as specified in the drawings. Weld in accordance with AWS D1.4.
(2) Mill Tests: Submit mill certificates indicating physical and chemical properties.
(3) Yield Strength: Actual yield strength, based on mill tests, does not exceed the specified yield strength by more than 18,000 psi. (Retests shall not exceed this value by more than an additional 3000 psi.)
(4) Ultimate Strength: The ratio of the actual tensile strength to the actual yield strength is not less than 1.25.
(5) Strain: Minimum elongation in 8 in. shall be at least:
   a. 14 percent for bar sizes No. 3 through No. 6
   b. 12 percent for bar sizes No. 7 through No. 11

FABRICATION: Conform to ACI 301, Section 3.2.2. "Fabrication", and ACI SP-66 "ACI Detailing Manual."

WELDING: Bars shall not be welded unless authorized. When authorized, conform to ACI 301, Section 3.2.2.2. "Welding", AWS D1.4, and provide ASTM A706, grade 60 reinforcement.

PLACING: Conform to ACI 301, Section 3.3.2 "Placing." Placing tolerances shall conform to ACI 117.

CONCRETE COVER: Conform to the following cover requirements unless noted otherwise in the drawings.

Concrete cast against earth	3"
Concrete exposed to earth or weather	2"
Ties in columns and beams	1-½"
Bars in slabs	¾"
Bars in walls	¾"
Exterior bars in Tilt-up Panels	1"

SPLICES: Conform to ACI 301, Section 3.3.2.7, "Splices". Refer to "Typical Lap Splice and Development Length Schedule" for typical reinforcement splices. Splices indicated on individual sheets shall control over the schedule. Mechanical connections may be used when approved by the SER.

FIELD BENDING: Conform to ACI 301 Section 3.3.2.8. "Field Bending or Straightening." Bar sizes #3 through #5 may be field bent cold the first time. Subsequent bends and other bar sizes require preheating. Do not twist bars. Bars shall not be bent past 45 degrees.

TYPICAL CONCRETE REINFORCEMENT: Unless noted on the plans, concrete walls shall have the following minimum reinforcement. Contractor shall confirm minimum reinforcement of walls with SER prior to rebar fabrication.

POST-INSTALLED ANCHORS (INTO CONCRETE and MASONRY)

REFERENCE STANDARDS: Conform to:
1) IBC Chapter 19 "Concrete"
2) ACI 318-19 "Building Code Requirements for Structural Concrete"
3) IBC Chapter 21 "Masonry"
4) TMS 402-16 "Building Code Requirements for Masonry Structures"

POST-INSTALLED ANCHORS: Install only where specifically shown in the details or allowed by SER. All post-installed anchors types and locations shall be approved by the SER and shall have a current ICC-Evaluation Service Report that provides relevant design values necessary to validate the available strength capacity. Submit current manufacturer's data and ICC ESR report to SER for approval regardless of whether or not it is a pre-approved anchor. Anchors shall be installed in strict accordance to ICC-ESR and the manufacturer's printed installation instructions (MPII) in conjunction with edge distance, spacing and embedment depth as indicated on the drawings. The contractor shall arrange for a manufacturer's field representative to provide installation training for all products to be used, prior to the commencement of work. Only trained installer shall perform post installed anchor installation. A record of training shall be kept on site and be made available to the SER as requested. Adhesive anchors installed in horizontally or upwardly inclined orientation shall be performed by a certified adhesive anchor installer (AAI) as certified through ACI/CRSI or approved equivalent. Proof of current certification shall be submitted to the engineer for approval prior to commencement of installation. No reinforcing bars shall be damaged during installation of post-installed anchors. Special inspection shall be per the TESTS and INSPECTIONS section. Anchor type, diameter and embedment shall be as indicated on drawings.

1. ADHESIVE ANCHORS: The following Adhesive-type anchoring systems have been used in the design and shall be used for anchorage to CONCRETE as applicable and in accordance with corresponding current ICC ESR report. Reference the corresponding ICC ESR report for required minimum age of concrete, concrete temperature range, moisture condition, light weight concrete, and hole drilling and preparation requirements. Drilled-in anchor embedment lengths shall be as shown on drawings, or not less than 7 times the anchor nominal diameter (7D). Adhesive anchors are to be installed in concrete aged a minimum of 21 days, unless otherwise specified in the ICC ESR report.
   a. HILTI "HIT-HY 200" – ICC ESR-3187 for anchorage to CONCRETE
   b. HILTI "HIT-RE 500 V3" – ICC ESR-3814 for anchorage to CONCRETE
   c. SIMPSON "SET-XP" – ICC ESR 2508 for anchorage to CONCRETE
2. EXPANSION ANCHORS: The following Expansion type anchors are pre-approved for anchorage to CONCRETE or MASONRY in accordance with corresponding current ICC ESR report:
   a. HILTI "KB TZ2" – ICC ESR-4266 for anchorage to CONCRETE], [ICC ESR-4561 for anchorage to MASONRY
   b. SIMPSON "STRONG-BOLT 2" – ICC ESR-3037 for anchorage to CONCRETE
3. ISCREW ANCHORS: The following Screw type anchor is pre-approved for anchorage to CONCRETE or MASONRY in accordance with corresponding current ICC ESR report:
   a. SIMPSON "TITEN HD" – ICC ESR-2713 for CARBON STEEL to CONCRETE], [ICC ESR-1056 for MASONRY Only], [IAPMO 493 for STAINLESS STEEL to CONCRETE

STRUCTURAL STEEL

REFERENCE STANDARDS: Conform to:
1) IBC Chapter 22 – "Steel"
2) ANSI/AISC 303-16 – "Code of Standard Practice for Steel Buildings & Bridges"
3) AISC – "Manual of Steel Construction", Fifteenth Edition (2016)
4) ANSI/AISC 360-16 – "Specification for Structural Steel Buildings"
5) AWS D1.1:2015 – "Structural Welding Code – Steel"
6) 2014 RCSC – "Specification for Structural Joints using High-Strength Bolts"

SUBMITTALS: Submit the following documents to the SER for review:

(1) SHOP DRAWINGS complying with AISC 360 Sections M1and N3 and AISC 303 Section 4.
(2) ERECTION DRAWINGS complying AISC 360 Sections M1and N3 and AISC 303 Section 4.

Make copies of the following documents "Available upon Request" to the SER or Owner's Inspection Agency in electronic or printed form prior to fabrication per AISC 360 Section N3.2 requirements:

(1) Fabricator's written Quality Control Manual that includes, as a minimum:
   a. Material Control Procedures
   b. Inspection Procedures
   c. Non-conformance Procedures
(2) Steel & Anchor Rod suppliers' Material Test Reports (MTR's) indicating the compliance with specifications.
(3) Fastener manufacturer's Certification documenting conformance with the specification.
(4) Filler metal manufacturer's product data for SMAW, FCAW and GMAW indicating:
   a. Product specification compliance
   b. Recommended welding parameters
   c. Recommended storage and exposure requirements including baking
   d. Limitations of use
(5) Welded Headed (Shear) Stud Anchors Manufacturer's certification indicating the meet specifications.
(6) Weld Procedure Specifications (WPS's) for shop and field welding.
(7) Manufacturer's Certificates of Conformance for electrodes, fluxes and gases (welding consumables).
(8) Procedure Qualification Records (PQR's) for WPS's that are not prequalified in accordance with AWS.
(9) Welding personnel Performance Qualification Records (WPQR) and continuity records conforming to AWS standards

MATERIALS:
Structural steel materials shall conform to materials and requirements listed in AISC 360 section A3 including, but not limited to:

Wide Flange (W), Tee (WT) Shapes	ASTM A992	Fy = 50 ksi
Structural (S), (M) & (HP) Shapes	ASTM A36,	Fy = 36 ksi
Channel (C) & Angle (L) Shapes	ASTM A36,	Fy = 36 ksi
Structural Plate (PL)	ASTM A36,	Fy = 36 ksi
High Strength Plate (Gr 50 PL)	ASTM A572,	Fy = 50 ksi
Hollow Structural Section – Square/Rect (HSS)	ASTM A500, Grade C	Fy = 50 ksi
Structural Pipe, (PIPE) 12" dia. and less	ASTM A53, Grade B	Fy = 35 ksi
High Strength, Heavy Hex Structural Bolts	ASTM F3125 Gr. A325/F1852, Type 1 or 3, Plain	
Heavy Hex Nuts	ASTM A563, Grade and Finish per RCSC Table 2.1	
Washers (Hardened Flat or Beveled)	ASTM F436, Grade and Finish per RCSC Table 2.1	
Anchor Rods (Anchor Bolts, typical)	ASTM F1554, Gr. 36	
Welded Headed Stud (WHS) Anchors	ASTM A108 – Nelson/TRW H4L	

STRUCTURAL JOINTS USING HIGH-STRENGTH BOLTS:

1) ASTM F3125 Gr. A325-N bolts – "threads NOT excluded in the shear plane".
2) High-strength bolted joints have been designed as "BEARING" connections.
3) Provide ASTM Bolt Grade and Type as specified in the Materials section above.
4) Provide Washers over outer ply of slotted holes and oversize holes per RCSC Table 6.1.
5) Provide Nut and Washer grades, types and finishes conforming to RCSC specification Table 2.1.
6) Provide *fastener assemblies* from a single supplier.
7) Joint Types shall be:
   a. ST - "Snug Tight", for typical beam end "shear" connections, unless noted otherwise.
   b. SC - "Slip Critical", where specifically indicated. Provide with Class A Faying surface.
8) Install bolts in joints in accordance with the RCSC Specification Section 8 and Table 4.1.
9) Inspection is per RCSC Section 9.

ANCHORAGE to CONCRETE:

1) SHEAR STUDS on STEEL BEAMS for COMPOSITE CONSTRUCTION: Headed Shear Studs welded to tops of Wide Flange Beams, shall be 3/4" diameter WHS with nominal stud lengths as indicated. Unless noted otherwise, provide minimum shear stud height equal to the (metal deck depth + 1 ½") and a maximum shear stud height that allows for ½" of concrete cover over the stud.
2) EMBEDDED STEEL PLATES for Anchorage to Concrete: Plates (PL) embedded in concrete with studs (WHS) or dowel bar anchors (DBA) shall be of the sizes and lengths as indicated on the plans with minimum 1/2" dia. WHS x 6" long but provide not less than ¾" interior cover or 1 ½" exterior cover to the opposite face of concrete, unless noted otherwise.
3) COLUMN ANCHOR RODS and BASE PLATES: All columns (vertical member assemblies weighing over 300 pounds) shall be provided with a **minimum of four ¾" diameter anchor rods**. Column base plates shall be at least ¾" thick, unless noted otherwise. Cast-in-place anchor rods shall be provided unless otherwise approved by the Engineer. Unless noted otherwise, embedment of cast-in-place anchor rods shall be 12 times the anch

e. QC inspections may be coordinated with Quality Assurance inspections per Section N5.3 where fabricators QA procedures provide the necessary basis for material control, inspection, and control of the workmanship expected by the Special Inspector.

WELDING:

1) Welding shall conform to AWS D1.1 with Prequalified Welding Processes except as modified by AISC 360 section J2. Welders shall be qualified in accordance with AWS D1.1 requirements.
2) Use 70ksi strength, low-hydrogen type electrodes (E7018) or E71T as appropriate for the process selected.
3) Welding of high strength anchor rods is prohibited unless approved by Engineer.
4) Welding of headed stud anchors shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding".

ERECTION:

1) Conform to AISC 360 Section M4 "Erection" and AISC 303 Section 7 "Erection".
2) Conform to AISC 360 Chapter N "Quality Control and Quality Assurance" and AISC 303 Section 8.
   a. The Erector shall maintain detailed erection quality control procedures that ensure that the work is performed in accordance with these requirements and the Contract Documents.
3) Steel work shall be carried up true and plumb within the limits defined in AISC 303 Section 7.13.
4) High strength bolting shall comply with the RCSC requirements including RCSC Section 7.2 "Required Testing", as applicable and AISC 360 Chapter J, Section M2.5 and Section N5.6.
5) Welding of HEADED STUD ANCHORS shall be in accordance with AWS D1.1 Chapter 7 "Stud Welding.
6) Provide Headed (Shear) Stud Anchors welded through the metal deck to tops of beams denoted in plans.
7) The contractor shall provide temporary bracing and safety protection required by AISC 360 Section M4.2 and AISC 303 Section 7.10 and 7.11.

PROTECTIVE COATING REQUIREMENTS:

1) SHOP PAINTING: Conform to AISC 360 Section M3 and AISC 303 Section 6.5 unless otherwise specified by the project specifications.

2) INTERIOR STEEL:
   a. Unless noted otherwise, ***do not paint*** any of the steel surfaces meeting the following conditions:
      - Concealed by the interior building finishes,
      - Fireproofed,
      - Embedded in concrete,
      - Specially prepared as a "faying surface" for Type-SC "slip-critical" connections including bolted connections that form a part of the Seismic Force Resisting System governed by AISC 341 unless the coating conforms to requirements of the RCSC Bolt Specification and is approved by the Engineer.
      - Welded; if area requires painting, do not paint until after weld inspections and non-destructive testing requirement, if any, are satisfied.

   b. Interior steel, exposed to view, shall be painted with one coat of shop primer unless otherwise indicated in the project specifications. Field touch-ups to match the finish coat or as otherwise indicated in the project specifications.

3) EXTERIOR STEEL: Exposed exterior steel shall be protected by either:
   a. Paint with an exterior multi-coat system as per the project specifications. Field touch-up painting shall as per the project specifications.

WOOD FRAMING

REFERENCE STANDARDS: Conform to:
(1) IBC Chapter 23 "WOOD"
(2) NDS - "2018 National Design Specification (NDS) for Wood Construction"
(3) ANSI/AWC – SDPWS-15: Special Design Provisions for Wind and Seismic
(4) APA D510C-12 Plywood Design Specification
(5) ANSI/TPI 1-2014 "National Design Standard for Metal-Plate-Connected Wood Truss Construction"
(6) BCSI B1 "Guide to Good Practice for Handling, Installing, Restraining & Bracing of Trusses"
(7) TPI DSB "Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses"
(8) APA Report TT-045B "Minimum Nail Penetration for Wood Structural Panel Connections Subject to Lateral Loads"
(9) APA Report TT-061 "1-5/16 Inch-Thick I-Joist Flanges and Diaphragm Nail Penetration

SUBMITTALS: Submit shop drawings to the Architect/Engineer for review. Shop drawings shall include member size, spacing, camber, material type, grade, shop and field assembly details and connections, types and location of bolts and other fasteners. Supply shop drawings for the following:
(1) Glued laminated members
(2) PSL members
(3) LVL members
(4) LSL members
(5) Tapered & Parallel Wood I Joists (Solid web-wood joists)
(6) Panelized wood walls & connection details
(7) Wood Tie-Down Systems

DEFERRED SUBMITTALS: Submit product data and proof of ICC approval for framing members and fasteners that have been designed by others. Submit calculations prepared by the SSE in the state of Californiafor all members and connections designed by others along with shop drawings. All necessary bridging, blocking, blocking panels and web stiffeners shall be detailed and furnished by the supplier. Temporary and permanent bridging shall be installed in conformance with the manufacturer's specifications. Deflection limits shall be as noted under DEFFERRED SUBMITTLALS section specific details. Products included are:

(1) Metal plate connected trusses (prefabricated trusses) Conform to IBC Section 2303.4. Truss Supplier to provide design and materials for all permanent truss bracing. Shop drawings shall provide for shapes, bearing points, intersections, hips, and valleys shown on the drawings. The manufacturer shall provide special hip, valley and intersection areas (step down trusses, jack trusses and girder trusses) unless specifically indicated on the plans. Provide all truss-to-truss and truss-to-support connection details and required connection materials. Specify temporary and permanent bracing and connections on the shop drawings. Provide all truss reactions on shop drawings.

(2) Solid web wood joists (I-joists)

(3) Wood Tie Down Systems: Continuous rod hold-down systems, with take-up devices, shall be as specified. Take-up devices are required at each framing level. Additional framing members shall be provided per the system requirements. Refer to details and loading on the structural drawings.

IDENTIFICATION: All sawn lumber and pre-manufactured wood products shall be identified by the grade mark or a certificate of inspection issued by the certifying agency.

MATERIALS:

- Sawn Lumber: Conform to grading rules of WWPA, WCLIB or NLGA and Table below. Finger jointed studs acceptable at interior walls only.

TABLE of SOLID SAWN LUMBER

Member Use	Size	Species	Grade
Wall Stud/ Top & Bottom Plates	2x4, 3x4, 2x6, 3x6	Doug Fir Larch	No. 2
Sill Plate (at concrete)	2x4, 3x4, 2x6, 3x6	PT Doug Fir Larch	No. 2
Post	4x4, 4x6, 4x8	Doug Fir Larch	No. 2
Floor or Roof Joist	2x6 through 2x12	Doug Fir Larch	No. 2
Beam	4x8 through 4x12	Doug Fir Larch	No. 2
Beam	6x8 through 6x12	Doug Fir Larch	No. 1
Post or Timber	6x6, 8x8	Doug-Fir Larch	No. 1

- Glued Laminated Timber: Conform to ANSI 117-**2020** "Standard Specifications for Structural Glued laminated Timber of Softwood Species, Manufacturing and Design" and ANSI A190.1 "Structural Glued Laminated Timber." Camber all glued laminated beams, except cantilevered and continuous beams, to 3000' radius, unless shown otherwise on the plans. Fabricate cantilevered and continuous beams flat, unless shown otherwise on plans.

TABLE of GLULAM and GRADE

Member	Sizes	Species	Comb. Symbol	Uses
Beams	All	DF/DF	24F–V4	Simple Spans
Beams	All	DF/DF	24F–V8	Continuous or with Cantilever Spans
Columns	All	DF	L2	Post, Truss Member

- Wood Structural Sheathing (Plywood): Wood APA-rated structural sheathing includes: all veneer plywood, oriented strand board, waferboard, particleboard, T1-11 siding, and composites of veneer and wood based material with T&G joint. **Architect** may disallow OSB. Confirm with **Architect**. Conform to "Construction and Industrial Plywood" based on Product Standard PS 1-09 by the U.S. Dept. of Commerce, and "Performance Standard for Wood-Based Structural-Use Panels" based on Product Standard PS 2-10 by the U.S. Dept. of Commerce and "Plywood Design Specification" based on APA D510C-12 by the American Plywood Association. Unless noted otherwise, sheathing shall comply with the following table:

TABLE of SHEATHING - Use, Minimum Thickness and Minimum APA Rating

Location	Thickness	Span Rating	Plywood Grade	Exposure
Roof	15/32"	32/16	C-D	1
Floor	23/32" T&G	24 OC	STURD-I-FLOOR	1
Walls	15/32"	32/16	C-D	1

Unless noted otherwise on drawings, install roof and floor panels with long dimension across supports and with panel continuous over two or more spans. End joints shall occur over supports.

- Timber Connectors: Shall be "Strong Tie" by Simpson Company as specified in their latest catalog. Alternate connectors by other manufacturers may be substituted provided they have current ICC approval for equivalent or greater load capacities and are reviewed and approved by the SER prior to ordering. Connectors shall be installed per the manufacturer's instructions. Where connector straps connect two members, place one-half of the nails or bolts in each member. Where straps are used as hold-downs, nail straps to wood framing just prior to drywall application, as late as possible in the framing process to allow the wood to shrink and the building to settle. Premature nailing of the strap may lead to strap buckling and potential finish damage.

  Where connectors are in exposed exterior applications in contact with preservative treated wood (PT) other than CCA, connectors shall be either batch hot-dipped galvanized (HDG), mechanically galvanized (ASTM B695, Class 55 minimum) stainless steel, or provided with 1.85 oz/sf of zinc galvanizing equal to or better than Simpson ZMAX finish.

  Nail straps to wood framing as late as possible in the framing process to allow the wood to shrink and the building to settle. Premature nailing of the strap may lead to strap buckling and potential finish damage.

- Fasteners (nails, bolts, screws, etc) attaching timber connectors (joist hangers, post caps and bases, etc) to PT wood shall have similar corrosion resistance properties (matching protective treatments) as the protected connector. Fasteners (nails, bolts, screws, etc) attaching sawn timber members or sheathing (shear walls) to PT wood shall be corrosion resistant; nails and lag bolts shall be either HDG (ASTM A153) or stainless steel. Verify the suitability of the fastener protection/coating with the wood treatment chemical manufacturer/supplier.

  Provide washers under the heads and nuts of all bolts and lag screws bearing on wood.

- Lag Bolts/Bolts: Conform to ASTM A307 and IBC Section 2304.10.

- Nails and Staples: Conform to ASTM F1667 and IBC Sections 2303.6 and 2304.10.

- Engineered Wood Products (TrusJoist): The following materials are based on lumber manufactured by TrusJoist and were used for the design as shown on the plans. Alternate products by other manufacturers may be substituted provided they have current ICC approval for equivalent or greater load and stiffness properties and are reviewed and approved by the Structural Engineer prior to ordering. [A HUD Material Release form is required for all manufactured wood products listed below]

  a. Laminated Veneer Lumber (LVL): Conform to **ICC ES Report No. ESR-1387** or CCMC Report No. 08675–R.
  b. Parallel Strand Lumber (PSL): Conform to **ICC ES Report No. ESR-1387** or CCMC Report No. 11161–R.
  c. Laminated Strand Lumber (LSL): Conform to **ICC ES Report No. ESR-1387** or CCMC Report No. 12627–R.
  d. Parallel Chord I-JOISTS (Deferred Submittal): Conform to **ICC Report No. ESR-1153** or CCMC Report No. 13132-R. The manufacturer shall design the joists for the spans and conditions shown on the plans. Joists shall have wood chords and solid wood webs.

TABLE of ENGINEERED WOOD Requirements

Type	Use	Widths	E(x10⁶)	Fb	Fv	Fc//
			PSI	PSI	PSI	PSI
LSL Rimboard	Rimboard or Stair Stringer	1 ½"	1.3E	1,700	425	1,835
Timberstrand LSL	Header, Beam or Column < 9" depth	3 ½"	1.3E	1,700	424	1,835
Timberstrand LSL	Rimboard, Header or Beam ≥ 9" depth	1 ¾", 3 ½"	1.55E	2,325	310	2,170
Timberstrand LSL	Wall Stud 2x4 & 2x6	1 ½"	1.5E	1,700	425	1,835
	Wall Stud >2x6	1 ½"	1.5E	2,525	505	2,105
Microllam LVL	Header, Beam	1 ¾"	2.0E	2,600	285	2,510
Parallam PSL	Header, Beam	3 ½", 5 ¼", 7"	2.0E	2,900	290	2,900
Parallam PSL	Column	3 ½", 5 ¼", 7"	1.8E	2,400	190	2,500

NAILING REQUIREMENTS: Conform to IBC Section 2304.10 "Connections and fasteners." Unless noted on plans, nail per Table 2304.10.1. Nailing for roof/floor diaphragms/shear walls shall be per drawings. Nails shall be driven flush and shall not fracture the surface of sheathing. Alternate nails may be used but are subject to review and approval by the Structural Engineer. Substitution of staples for the nailing of rated sheathing is subject to review by the structural engineer prior to construction.

STANDARD LIGHT-FRAME CONSTRUCTION: Unless noted on the plans, construction shall conform to IBC Section 2308 "Conventional Light-Frame Construction."

NAILERS ON STEEL COLUMNS and BEAMS: Wood 3x nailers are generally required on all HSS columns and steel beams abutting or embedded within wood framing. Unless noted otherwise, attach with 5/8" diameter bolts or welded studs at 16" on centers. Unless noted otherwise, wood nailers on beams supporting joist hangers shall not overhang the beam flange by more than ¼".

WOOD SHRINKAGE AND EXPANSION: Wood materials will expand or contract based on relative changes in moisture. The contractor is responsible for means and methods of construction related to mitigating and managing the effects of changes in moisture.

MOISTURE CONTENT: The contractor shall make provisions during handling and construction to prevent the structural wood members from exceeding the appropriate moisture content limits. The moisture content for solid sawn wood material used for this project shall not exceed 19%. The moisture content for engineered wood products, laminated lumber and sheathing shall not exceed the limits required by the manufacturer or 12%, whichever is less. The moisture content limits may be more stringent for particular product requirements (eg. finishes, cladding, insulation systems, etc.). The contractor shall refer to the Architect's drawings, project specifications, or installer/product requirements for additional requirements.

SHRINKAGE COMPENSATION FOR MECHANICAL, ELECTRICAL, AND PLUMBING SYSTEMS: MEP systems, including ductwork, pipes, and other elements that run continuously between levels shall be installed/designed in such a manner to accommodate shrinkage in the wood framing. Wood shrinkage amounts will vary depending on the construction process and materials used. The anticipated shrinkage under typical conditions is expected to range between 1/8" and 1/4" per floor.

CLADDING COMPATIBILITY: The Architect/Owner and contractor shall review the cladding, finishes, insulation systems, other non-structural components and construction procedures proposed for the project with respect to their performance over wood framing. EIFS systems should be avoided on wood-framed projects due to problems with moisture proofing. Note that DCI is not responsible for the attachment of the cladding to the wood studs which needs to be verified and provided by the cladding supplier.

PRESERVATIVE TREATMENT (PT): Wood materials that are required to be "treated wood" in accordance with IBC Section 2304.12: "Protection Against Decay and Termite Protection" shall conform to the appropriate standards of the American Wood-Preservers Association (AWPA) for sawn lumber, glued laminated timber, round poles, wood piles and marine piles. Follow American Lumber Standards Committee (ALSC) quality assurance procedures. Products shall bear the appropriate mark. Fasteners or anchors in treated wood shall be of stainless steel or hot-dipped galvanized or as per IBC 2304.10.5.

Mud sill plates in normally dry interior applications may be treated with Sodium Borate (DOT - Disodium Octaborate Tetrahydrate) as recent studies have noted less connector corrosion potential than other available wood treatments or the original CCA treated sill plates. Wood treated with Sodium Borate shall be protected during shipment, storage and installation to minimize leaching of the water-soluble preservative from the lumber. Sodium borate pressure treated plates do not require hot-dipped galvanized connectors.

If using preservative treatments other than CCA or sodium borate, fasteners must be hot dipped galvanized or stainless steel. Wood treated with Alkaline Copper Quaternary (ACQ) requires steel components in contact with the wood to be stainless (nails, bolts, screws, washers & lag screws). Fasteners (nails, bolts, screws, washers & lag screws) attaching timber connectors (joist hangers, post caps and bases, etc) to PT wood shall have similar corrosion resistance properties (matching protective treatments) as the protected connector; that is, use hot dipped galvanized or stainless-steel fasteners. Fasteners (nails, bolts, screws, washers & lag screws) attaching sawn timber members or sheathing (shear walls) to Pressure Treated wood shall be corrosion resistant (hot dipped galvanized or stainless steel).

Always verify the suitability of the fastener protection/coating with the wood treatment chemical manufacturer/supplier.

Fire Retardant Treated (FRT) Wood: Wood material that is required to be Fire Retardant Treated Wood to conform to IBC section 2303.2 – "Fire Retardant Treated Wood." Submit ICC report to SEOR for review and approval prior to construction.

STRUCTURAL SHEET LIST

SHEET NUMBER	SHEET TITLE
S0-00	STRUCTURAL -GENERAL NOTES
S0-01	STRUCTURAL -GENERAL NOTES
S0-02	STRUCTURAL -SPECIAL INSPECTIONS
S1-00	STRUCTURAL -FOUNDATION / STUD AND SHEAR WALL PLAN
S1-11	STRUCTURAL -ROOF FRAMING PLAN
S2-00	STRUCTURAL -FOUNDATION DETAILS
S2-01	STRUCTURAL -FOUNDATION DETAILS
S3-00	STRUCTURAL -FRAMING DETAILS
S3-01	STRUCTURAL -FRAMING DETAILS
S4-00	STRUCTURAL -STEEL DETAILS
S4-01	STRUCTURAL -STEEL DETAILS
Sheet Total: 11	

DRAWING LEGEND

MARK	DESCRIPTION	MARK	DESCRIPTION
F2.0	FOOTING SYMBOL (REFER TO SPREAD FOOTING SCHEDULE)		INDICATES WIDE FLANGE COLUMN
P1	PILE CAP SYMBOL (REFER TO PILE CAP SCHEDULE)		INDICATES HOLLOW STRUCTURAL SECTION (HSS) COLUMN OR TUBE STEEL (TS) COLUMN
1	TILT-UP/PRECAST CONCRETE WALL CONNECTION SYMBOL (REFER TO CONNECTION DETAIL)		INDICATES HOLLOW STRUCTURAL SECTION (HSS) COLUMN OR STEEL PIPE COLUMN
2W4	SHEAR WALL SYMBOL (REFER TO SHEAR WALL SCHEDULE)		INDICATES WOOD POST
1 RFI 00	REVISION TRIANGLE		INDICATES BUNDLED STUDS
1	TILT-UP/PRECAST CONCRETE WALL PANEL NUMBER (REFER TO TILT-UP/ PRECAST CONCRETE WALL ELEVATIONS)		INDICATES CONCRETE COLUMN
1	CMU WALL REINFORCING SYMBOL (REFER TO CMU WALL REINFORCING SCHEDULE)	PC1 12x12	INDICATES PRECAST CONCRETE COLUMN
8"	CONTINUITY PLATE LENGTH (REFER TO TYPICAL DETAIL)		INDICATES MOMENT FRAME CONNECTION
DS	INDICATES DOUBLE SHEAR CONNECTION (REFER TO THE DOUBLE SHEAR PLATE CONNECTIONS DETAIL)		INDICATES CANTILEVER CONNECTION
DTB	INDICATES REINFORCING TYPE (REFER TO THE REINFORCING SCHEDULE)		INDICATES DRAG CONNECTION
SR	INDICATES NUMBER OF STUD RAIL REQUIRED AT COLUMN (REFER TO STUD RAIL DETAILS)		INDICATES A LEDGER
1	ROOF/FLOOR DIAPHRAGM NAILING SYMBOL (REFER TO DIAPHRAGM NAILING SCHEDULE)		INDICATES WOOD OR STEEL STUD BEARING WALL LINE PER KEY ON SHEET
C1 COLUMN SIZE	STEEL/CONCRETE COLUMN SYMBOL (REFER TO STEEL COLUMN SCHEDULE)	OR	INDICATES WOOD OR STEEL STUD SHEAR WALL LINE AND HOLD-DOWNS PER KEY ON SHEET
T/FTG = X'-X"	ELEVATION SYMBOL (T/ REFERS TO COMPONENT THAT THE ELEVATION REFERENCES)		INDICATES MASONRY/CMU WALL
3	STUD BUBBLE (INDICATES NUMBER OF STUDS REQUIRED IF EXCEEDS NUMBER SPECIFIED IN PLAN NOTE)		INDICATES CONCRETE/TILT-UP CONCRETE WALL
	INDICATES STEP IN FOOTING (REFER TO TYPICAL STEP IN FOOTING DETAIL)		INDICATES BEARING WALL BELOW
X SX.X	DETAILS OR SECTION CUT (DETAIL NUMBER/SHEET NUMBER)		INDICATES EXISTING WALL
00 S0.0	DETAILS OR SECTION CUT IN PLAN VIEW (DETAIL NUMBER/SHEET NUMBER)		POST-TENSION DEAD END (PLAN)
XX/SXX.XX	INDICATES LOCATION OF CONCRETE WALLS, SHEAR WALLS OR BRACED FRAME ELEVATIONS		POST-TENSION STRESSING END (PLAN)
	STRUCTURAL EXTENT SYMBOL SINGLE ARROW - END OF EXTENT DOUBLE ARROW - CONTINUOUS EXTENT ALONG THE ELEMENT LINE UNTIL THE ELEMENT IS INTERRUPTED	3	POST-TENSION PROFILE (PLAN) (IN INCHES)
			INTERMEDIATE STRESSING (PLAN)
	INDICATES DIRECTION OF DECK SPAN		

ABBREVIATIONS

L	Angle	FB	Factory-Built	PJP	Partial Joint Penetration
AB	Anchor Bolt	FD	Floor Drain	PREFAB	Prefabricated
ADDL	Additional	FDN	Foundation	PSF	Pounds per Square Foot
ADH	Adhesive	FIN	Finish	PSI	Pounds Per Square Inch
ALT	Alternate	FLR	Floor	PSL	Parallel Strand Lumber
ARCH	Architectural	FRP	Fiberglass Reinforced Plastic	P-T	Post-Tensioned
B or BOT	Bottom	FRT	Fire Retardant Treated	PT	Pressure Treated
BJ	Bottom Of	FTG	Footing	R	Radius
BLDG	Building	F/	Face of	RD	Roof Drain
BLKG	Blocking	GA	Gage	REF	Refer/Reference
BMU	Brick Masonry Unit	GALV	Galvanized	REINF	Reinforcing
BP	Baseplate	GEOTECH	Geotechnical	REQD	Required
BRBF	Buckling Restrained Braced Frame	GL	Glue Laminated Timber	RET	Retaining
		GWB	Gypsum Wall Board	SB	Site-Built
BRG	Bearing	HDR	Header	SCBF	Special Concentric Braced Frame
BTWN	Between	HF	Hem-Fir		
C	Camber	HGR	Hanger	SCHED	Schedule
CB	Castellated Beam	HD	Hold-down	SER	Structural Engineer of Record
C'BORE	Counterbore	HORIZ	Horizontal		
CL or ℄	Centerline	HP	High Point	SFRS	Seismic Force-Resisting System
CLT	Cross-Laminated Timber	HSS = TS	(Hollow Structural Section)		
CIP	Cast in Place	IBC	International Building Code	SHTHG	Sheathing
CJ	Construction or Control Joint	ID	Inside Diameter	SIM	Similar
		IE	Invert Elevation	SLBB	Short Leg Back-to-Back
CJP	Complete Joint Penetration	IF	Inside Face	SMF	Special Moment Frame
		INT	Interior	SOG	Slab on Grade
CLR	Clear	k	Kips	SP	Southern Pine
CLG	Ceiling	KSF	Kips Per Square Foot	SPEC	Specification
CMU	Concrete Masonry Unit	LF	Lineal Foot	SQ	Square
COL	Column	LL	Live Load	SR	Studrail
CONC	Concrete	LLBB	Long Leg Back-to-Back	SF	Square Foot
CONN	Connection	LLH	Long Leg Horizontal	SST	Stainless Steel
CONST	Construction	LLV	Long Leg Vertical	STAGG	Stagger/Staggered
CONT	Continuous	LP	Low Point	STD	Standard
C'SINK	Countersink	LONGIT	Longitudinal	STIFF	Stiffener
CTRD	Centered	LSL	Laminated Strand Lumber	STL	Steel
DIA	Diameter	LVL	Laminated Veneer Lumber	STRUCT	Structural
DB	Drop Beam	MAS	Masonry	SWWJ	Solid Web Wood Joist
DBA	Deformed Bar Anchor	MAX	Maximum	SYM	Symmetrical
DBL	Double	MECH	Mechanical	T	Top
DEMO	Demolish	MEP	Mechanical, Electrical, Plumbing	T/	Top Of
DEV	Development			T&B	Top & Bottom
DF	Douglas Fir	MEZZ	Mezzanine	TC AX LD	Top Chord Axial Load
DIAG	Diagonal	MFR	Manufacturer	TCX	Top Chord Extension
DIST	Distributed	MIN	Minimum	TDS	Tie Down System
DL	Dead Load	MISC	Miscellaneous	T&G	Tongue & Groove
DN	Down	NIC	Not In Contract	THKND	Thickened
DO	Ditto	NLT	Nail-Laminated Timber	THRD	Threaded
DP	Depth/Deep	NTS	Not To Scale	THRU	Through
DWG	Drawing	OC	On Center	TRANSV	Transverse
(E)	Existing	OCBF	Ordinary Concentric Braced Frame	TYP	Typical
EA	Each			UNO	Unless Noted Otherwise
EF	Each Face	OD	Outside Diameter	URM	Unreinforced Masonry
EL	Elevation	OF	Outside Face		Unit
ELEC	Electrical	OPNG	Opening	VERT	Vertical
ELEV	Elevator	OPP	Opposite	W	Wide
EMBED	Embedment	OWSJ	Open Web Steel Joist	W/	With
EQ	Equal	OWWJ	Open Web Wood Joist	W/O	Without
EQUIP	Equipment	PL	Plate	WHS	Welded Headed Stud
EW	Each Way	PAF	Powder Actuated Fastener	WP	Working Point
EXP	Expansion	PC	Precast	WWF	Welded Wire Fabric
EXP JT	Expansion Joint	PERP	Perpendicular	±	Plus or Minus
EXT	Exterior	PLWD	Plywood		

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PUBLIC WORKS

CLIENT

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REGISTERED PROFESSIONAL ENGINEER JAMES M. SHEA 36283 Exp. 6/30/25 STRUCTURAL STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

X REVISIONS

SEAL / SIGNATURE

JOB NO.	21071-0034
DRAWN	DCI
CHECK	SM

GENERAL NOTES

SHEET
S0-01

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SPECIAL INSPECTIONS

The following Statement and Schedules of Inspections are those Special Inspections and Tests that shall be performed for this project. Special Inspectors shall reference these plans and IBC Chapter 17 for all special inspection requirements.
The owner shall retain an "approved agency" per IBC 1703 to provide special inspections for this project. Special Inspectors shall be qualified persons per CBC 1704.2.1.
Special inspection reports shall be provided on a weekly basis. Submit copies of all inspection reports to the Architect/Engineer and the Authority Having Jurisdiction for review. In addition to special inspection reports and tests, submit reports and certificates noted in IBC 1704.5 to the Authority Having Jurisdiction. Final special inspection reports will be required by each special inspection firm per IBC 1704.2.4.

STATEMENT OF SPECIAL INSPECTIONS:

This statement of Special Inspections has been written with the understanding that the Building Official will:
- **Review and approve the qualifications of the Special Inspectors**
- **Monitor the special inspection activity on the project site to assure that Special Inspectors are qualified and performing their duty as state within this statement.**
- **Review all Special Inspection Reports submitted to them by the Special Inspector**
- **Perform inspections as required by CBC Section 110.3.**

The following Special Inspections are applicable to this project:
- **Special Inspections for Standard Buildings (per CBC 1705.1) REQUIRED**
- **Special Inspections for Seismic Resistance (per CBC 1705.12) REQUIRED**
- **Testing for Seismic Resistance (per CBC 1705.13) REQUIRED**
- **Special Inspections for Wind Resistance (per CBC 1705.11) REQUIRED**

STRUCTURAL STEEL

per IBC 1705.2.1

A qualified Special Inspector of an "approved agency" providing Quality Assurance (QA) Special Inspections for the project shall review and confirm the Fabricator and Erector's Quality Control (QC) procedures for completeness and adequacy relative to AISC 360-16 Chapter N, AISC 303-16 Code of Standard Practice, AWS D1.1-2015 Structural Welding Code, and 2018 CBC code requirements for the fabricator's scope of work.

- QA Agency providing Special Inspections shall provide personnel meeting the minimum qualification requirements for Inspection and Nondestructive Testing NDT per AISC 360 Section N4.
- Verify Fabricator and Erector QC Program per AISC 360 Section N2.
- Inspection of welds and bolts by both QC and QA personnel shall be per the Schedule of Special Inspections below. All provisions of AWS D1.1 Structural Welding Code for statically loaded structures shall apply.
- Nondestructive Testing (NDT) of welds:
  - Non-Destructive Testing (NDT) of welded joints per AISC 360 N5.5
  - Risk Category for determination of extent of NDT per AISC 360 N5.5b is noted in the Design Criteria and Loads section of these General Requirements.
  - NDT performed shall be documented and reports shall identify the tested weld by piece mark and location of the piece.
  - For field work, the NDT report shall identify the tested weld by location in the structure, piece mark and location of the piece.
- Additional Inspection tasks per AISC 360 Section N5.8.
- Inspection for Composite Construction shall be done per AISC 360 Section N6.

POST-INSTALLED ANCHORS TO CONCRETE AND MASONRY: shall comply with IBC Section 1703. Inspections shall be in accordance with the requirements set forth in the approved ICC Evaluation Report and as indicated by the design requirements specified on the drawings. Refer to the POST INSTALLED ANCHORS section of these notes for anchors that are the basis of the design. Special inspector shall verify anchors are as specified in the POST INSTALLED ANCHORS section of these notes or as otherwise specified on the drawings. Substitutions require approval by the SER and require substantiating calculations and current 2018 CBC recognized ICC Evaluation Services (ES) Report. Special Inspector shall document in their Special Inspection Report compliance with each of the elements required within the applicable ICC Evaluation Services (ES) Report.

PREFABRICATED CONSTRUCTION: All prefabricated construction shall conform to IBC Section 1703.

SCHEDULES OF SPECIAL INSPECTIONS:

TABLE 1705.6 - REQUIRED SPECIAL INSPECTIONS AND TEST OF SOILS

ITEM	TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1	Verify materials below shallow foundations are adequate to achieve the design bearing capacity	-	X
2	Verify excavations are extended to proper depth and have reach proper material	-	X
3	Perform classification and testing of compacted fill materials	-	X
4	Verify use of proper materials, densities and list thickness during placement and compaction of compacted fill	X	-
5	Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly	-	X

TABLE 1705.3 - REQUIRED SPECIAL INSPECTIONS AND TESTS OF CONCRETE CONSTRUCTION

ITEM	TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD	**CBC** REFERENCE
1	Inspection, reinforcement, including pre-stressing tendons, and verify placement.	-	X	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2	Reinforcing bar welding: a. Verify weldability of reinforcing bars other than ASTM A706 b. Inspect single pass fillet weld maximum 5/16" c. Inspect all other welds	- - X	X X -	AWS D1.4 ACI 318: 26.6.4	-
3	Inspect anchors cast in concrete	-	X	ACI 318: 17.8.2	-
4	Inspect anchors post-installed in hardened concrete members: a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads b. Mechanical anchors and adhesive anchors not defined in 4.a	X -	- X	ACI 318: 17.8.2.4 ACI 318: 17.8.2	-
5	Verify use of required design mix	-	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6	Prior to concrete placement, fabricate specimens, for strength tests, perform slump and air content tests, and determine the temperature of the concrete	X	-	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12	1908.10
7	Inspect concrete and shotcrete placement for proper application techniques	X	-	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8	Verify maintenance of specified curing temperature and techniques	-	X	ACI 318 :26.5.3 — 26.5.5	1908.9
12	Inspect formwork for shape, location and dimensions of the concrete member being formed	-	X	ACI 318: 26.11.1.2 (b)	-

REQUIRED SPECIAL INSPECTIONS OF WOOD CONSTRUCTION

ITEM	TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION	REFERENCED STANDARD
2	Metal Plate connected wood trusses spanning 60 feet or greater [a] Temporary installation restraint/bracing and permanent individual truss member restraint/bracing installation	X	-	CBC Section 1705.5.2
3	Shear Walls (where fastener spacing of the sheathing is 4 inches or less on center) [a] Anchor Bolts including proper bottom plate sizes (2x and 3x) and plate washers [b] Hold-downs (HD) and Continuous Rod Tie-Down Systems (TDS) including squash blocks and anchors to concrete [c] A35 and LPT shear connectors [d] Strap Connectors [e] Boundary Edge Nailing [f] Plate Nailing and Panel Edge Nailing for size and spacing [g] Blocking	 - - - - - -	 X X X X X X X	CBC Section 1705.11.1
4	Blocked and Unblocked Diaphragms (where fastener spacing of the sheathing is 4 inches or less on center) [a] Blocking and strap connections [b] Boundary edge and panel shear nailing size and spacing	 - -	 X X	CBC Section 1705.11.1
5	Moisture Content of wood studs, plates, beams, decking, and joists	-		As directed by the Contractor to meet moisture content requirements
6	Roof truss 'hurricane clips'	-	X	

MINIMUM REQUIREMENTS FOR INSPECTIONS OF STRUCTURAL STEEL CONSTRUCTION

ITEM	INSPECTION TASKS	QC	QA	REFERENCED STANDARD
	INSPECTION TASKS PRIOR TO WELDING			
1	Welder qualification records and continuity records	P	O	AISC 360 TABLE N5.4-1
2	Welding procedure specifications (WPSs) available	P	P	AISC 360 TABLE N5.4-1
3	Manufacturing certifications for welding consumables available	P	P	AISC 360 TABLE N5.4-1
4	Material identification (type/grade)	O	O	AISC 360 TABLE N5.4-1
5	Welder Identification system	O	O	AISC 360 TABLE N5.4-1
6	Fit-up of groove welds (including joint geometry) •Joint preparation •Dimensions (alignment, root opening, root face, bevel) •Cleanliness (condition of steel surfaces) •Tacking (tack welding quality and location) •Backing type and fit (if applicable)	O	O	AISC 360 TABLE N5.4-1
7	Fit-up of CJP groove welds of HSS T-, Y-, and K-joints without backing (including joint geometry) • Joint preparation • Dimensions (alignment, root opening, root face, bevel) • Cleanliness (condition of steel surfaces) • Tacking (tack welding quality and location)	P	O	AISC 360 TABLE N5.4-1
8	Configuration and finish of access holes	O	O	AISC 360 TABLE N5.4-1
9	Fit-up of fillet welds •Dimensions (alignment, gaps at root) •Cleanliness (condition of steel surfaces) •Tacking (tack weld quality and location)	O	O	AISC 360 TABLE N5.4-1
10	Check welding equipment	O	-	AISC 360 TABLE N5.4-1
	INSPECTION TASKS DURING WELDING			
1	Use of qualified welders	O	O	AISC 360 TABLE N5.4-2
2	Control and handling of welding consumables • Packag ing • Exposu re control	O	O	AISC 360 TABLE N5.4-2
3	No welding over cracked tack welds	O	O	AISC 360 TABLE N5.4-2
4	Environmental conditions • Wind speed within limits • Precipit ation and temperature	O	O	AISC 360 TABLE N5.4-2
5	WPS followed • Setting s on welding equipment • Travel speed • Selecte d welding materials • Shieldi ng gas type/flowrate • Prehea t applied • Interpa ss temperature maintained (min/max) • Proper position (F, V, H, OH)	O	O	AISC 360 TABLE N5.4-2
6	Welding techniques • Interpa ss and final cleaning • Each pass within profile limitations • Each pass meets quality requirements	O	O	AISC 360 TABLE N5.4-2
	INSPECTION TASKS AFTER WELDING			
1	Welds cleaned	O	O	AISC 360 TABLE N5.4-3
2	Size, length, and locations of welds	P	P	AISC 360 TABLE N5.4-3
3	Welds meet visual acceptance criteria • Crack prohibition • Weld/b ase-metal fusion • Crater cross section • Weld profiles • Weld size • Underc ut • Porosit y	P	P	AISC 360 TABLE N5.4-3
4	Arc strikes	P	P	AISC 360 TABLE N5.4-3
5	k-area	P	P	AISC 360 TABLE N5.4-3
6	Weld access holes in rolled heavy shapes and built-up heavy shapes	P	P	AISC 360 TABLE N5.4-3
7	Backing removed and weld tabs removed (if required)	P	P	AISC 360 TABLE N5.4-3
8	Repair activities	P	P	AISC 360 TABLE N5.4-3
9	Document acceptance or rejection of welded joint or member	P	P	AISC 360 TABLE N5.4-3
10	No prohibited welds have been added without the approval of the EOR	P	P	AISC 360 TABLE N5.4-3
	INSPECTION TASKS PRIOR TO BOLTING			
1	Manufacturer's certifications available for fastener materials	O	P	AISC 360 TABLE N5.6-1
2	Fasteners marked in accordance with ASTM requirements	O	O	AISC 360 TABLE N5.6-1
3	Correct fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)	O	O	AISC 360 TABLE N5.6-1
4	Correct bolting procedure selected for joint detail	O	O	AISC 360 TABLE N5.6-1
5	Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements	O	O	AISC 360 TABLE N5.6-1
6	Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.	P	O	AISC 360 TABLE N5.6-1
7	Proper storage provided for bolts, nuts, washers and other fasteners components	O	O	AISC 360 TABLE N5.6-1
	INSPECTION TASKS DURING BOLTING			
1	Fastener assemblies, of suitable condition, placed in all holes and washers are positioned as required	O	O	AISC 360 TABLE N5.6-2
2	Joint brought to the snug-tight condition prior to the pre-tensioning operation	O	O	AISC 360 TABLE N5.6-2
3	Fastener component not turned by the wrench prevented from rotating	O	O	AISC 360 TABLE N5.6-2
4	Fasteners are pre-tensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges	O	O	AISC 360-10 TABLE N5.6-2
	INSPECTION TASKS AFTER BOLTING			
1	Document acceptance or rejection of bolted connections	P	P	AISC 360 TABLE N5.6-3

O - Observe these items on a random basis. Operations need not be delayed pending these inspections
P - Perform these tasks for each welded joint or member, each bolted connection, or each steel element

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REGISTERED PROFESSIONAL ENGINEER JAMES M. 36283 Exp. 6/30/25 STRUCTURAL STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET 06.03.25
ADDITIONAL DATE (OPT) 00.00.00
REVISIONS

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JOB NO. 21071-0034
DRAWN DCI
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SPECIAL INSPECTIONS

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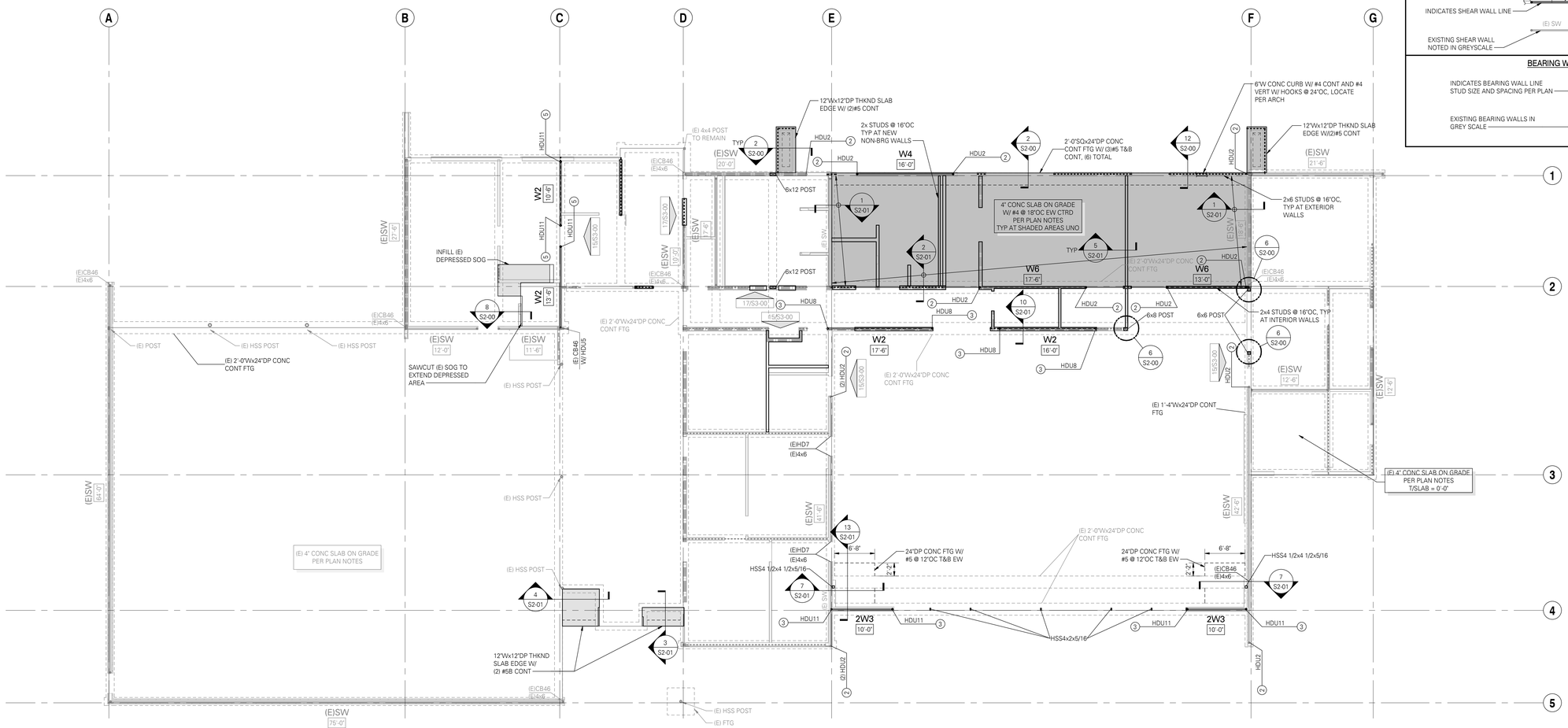
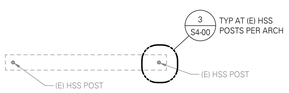
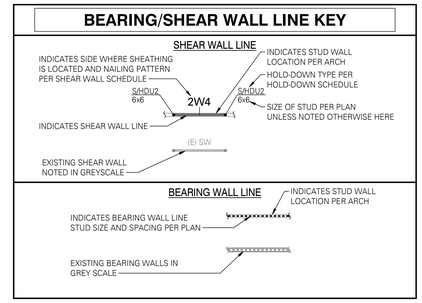




BEARING/SHEAR WALL LINE KEY



FOUNDATION NOTES:

1. STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND LEGEND PER S0-00 AND S0-01.
2. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH THE ARCHITECTURAL DRAWINGS. ALL EXISTING DIMENSIONS SHALL BE FIELD VERIFIED.
3. CONTRACTOR SHALL LOCATE AND VERIFY THE FOLLOWING WITH OTHERS PRIOR TO POURING CONCRETE: ALL DOOR OPENINGS IN FOUNDATION WALLS; DRAINS AND SLOPES; BLOCKOUTS FOR PLUMBING. ALL DUCTS, CHASES AND PIPES PER MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS. STAIR DETAILS AND GUARDRAILS PER ARCHITECTURAL DRAWINGS. CONCRETE CURBS AND LOCATIONS PER ARCHITECTURAL DRAWINGS.
4. TOP OF SLAB (T/SLAB) ELEVATION ASSUMED 0'-0". FOR ACTUAL T/SLAB ELEVATION REFER TO CIVIL AND ARCHITECTURAL DRAWINGS. PROVIDE 6 MIL VAPOR BARRIER BELOW SLAB AT INTERIOR SPACES. PROVIDE FREE-DRAINING GRANULAR FILL PER GEOTECH REPORT.
5. TYPICAL TOP OF INTERIOR (T/INTERIOR) FOOTING ELEVATION = 0'-0", UNO. TYPICAL TOP OF EXTERIOR T/EXTERIOR) FOOTING ELEVATIONS = 0'-0", UNO.
6. ALL FOOTINGS AND SLABS TO BEAR ON COMPETENT NATIVE SOIL AND/OR STRUCTURAL FILL. SUBGRADE PREPARATION, STRUCTURAL FILL, FOOTING DRAINS, AND OTHER REQUIREMENTS PER GEOTECH REPORT AS NOTED IN THE STRUCTURAL GENERAL NOTES.
7. ALL WOOD EXPOSED TO CONCRETE, WEATHER, OR WITHIN 8" OF FINISHED GRADE SHALL BE PRESSURE-TREATED.
8. MOISTURE PROOF ALL CONCRETE STEM AND BASEMENT WALLS PER ARCHITECT.
9. STEEL STAIRS SHALL BE BIDDER-DESIGNED, UNO. APPLICABLE DESIGN REQUIREMENTS PER STRUCTURAL GENERAL NOTES.
10. TYPICAL DETAILS PER:

9/S2-00	STANDARD HOOKS AND BAR BENDS
8/S2-00	TYPICAL DEPRESSED SLAB DETAIL
2/S2-00	TYPICAL THICKENED SLAB EDGE FOOTING
4/S2-00	PLAN - SLEEVES THRU CONCRETE SLAB
6/S2-00	INTERIOR THICKENED SLAB FOOTING AT WOOD POST
7/S2-00	PIPE OR CONDUIT EMBEDDED IN SLAB ON GRADE
10/S2-00	TYPICAL LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE
11/S2-00	INTERIOR THICKENED SLAB EDGE FOOTING AT STUD WALL
12/S2-00	EXTERIOR THICKENED SLAB EDGE FOOTING AT STUD WALL
13/S2-00	TYPICAL SLAB ON GRADE JOINT DETAILS WITH REINFORCING
18/S2-00	TYPICAL PIPE AND TRENCH LOCATIONS AT CONCRETE STEMWALL/FOOTING

STUD AND SHEAR WALL NOTES:

1. LUMBER GRADE PER STRUCTURAL GENERAL NOTES.
2. ALL INTERIOR NON-BEARING, NON-STRUCTURAL WALL STUD REQUIREMENTS PER STRUCTURAL GENERAL NOTES.
3. HEADERS SHOWN ON FRAMING PLAN SHALL BE SUPPORTED BY (1) TRIMMER AND (1) KING STUD MINIMUM, UNO. WHERE MORE THAN (1) KING IS REQUIRED, THE NUMBER OF TRIMMER & KING STUDS SHALL BE NOTED THUS: ■ ③. TRIMMERS & KING STUDS TO BE CONTINUOUS TO THE FOUNDATION. BLOCK SOLID AT FLOOR FRAMING.
4. BEAMS SHOWN ON FRAMING PLAN SHALL BE SUPPORTED BY (2) BUNDLED STUDS MINIMUM, UNO. WHERE MORE THAN (2) BUNDLED STUDS ARE REQUIRED, THE NUMBER OF BUNDLED STUDS SHALL BE NOTED THUS: ■ ③ . BUNDLED STUDS TO BE CONTINUOUS TO THE FOUNDATION. BLOCK SOLID AT FLOOR FRAMING.
5. SHEAR WALL AND NAILING REQUIREMENTS PER SHEAR WALL SCHEDULE, DETAIL 18/S-300.
6. AT STAGGERED STUD WALLS, BUNDLED STUDS, TRIMMER STUDS, KING STUDS, AND SHEAR WALL COMPRESSION STUDS ARE TO MATCH THE WIDTH OF THE WALL PLATES.
7. TYPICAL HOLD-DOWN ELEVATION PER DETAIL 16/S-200.
8. ANCHOR BOLTS TO BE 5/8" DIA x 7" MINIMUM EMBEDMENT PER 4/S4-00. PROVIDE HOT-DIPPED GALVANIZED ANCHOR BOLTS AT PRESSURE-TREATED SILL PLATES. HOT-DIPPED GALVANIZED ANCHOR BOLTS ARE NOT REQUIRED AT SODIUM BORATE PRESSURE TREATED PLATES PER STRUCTURAL GENERAL NOTES.
9. TYPICAL DETAILS PER:

12/S3-00	
4/S3-00	TYPICAL SHEAR WALL ELEVATION
1/S3-00	TYPICAL STUD WALL OPENING (HEADER) DETAIL
7/S3-00	TYPICAL TOP PLATE SPLICE DETAIL
3/S3-00	TYPICAL HOLES AND NOTCHES IN WOOD STUDS
9/S3-00	TYPICAL NAILING FOR BUNDLED STUDS
10/S3-00	HOLD-DOWN / STRAP SCHEDULE
18/S3-00	PLAN - INTERSECTING SHEAR WALLS
4/S4-00	SHEAR WALL SCHEDULE
	TYPICAL SILL PLATE ANCHORAGE TO CONCRETE

FOUNDATION / STUD AND SHEAR WALL PLAN

SCALE: 1/8" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER
TIMOTHY JAMES MEY
56283
Exp. 6/30/25
STRUCTURAL
STATE OF CALIFORNIA

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12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00
X REVISIONS	
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FOUNDATION / STUD AND SHEAR WALL PLAN

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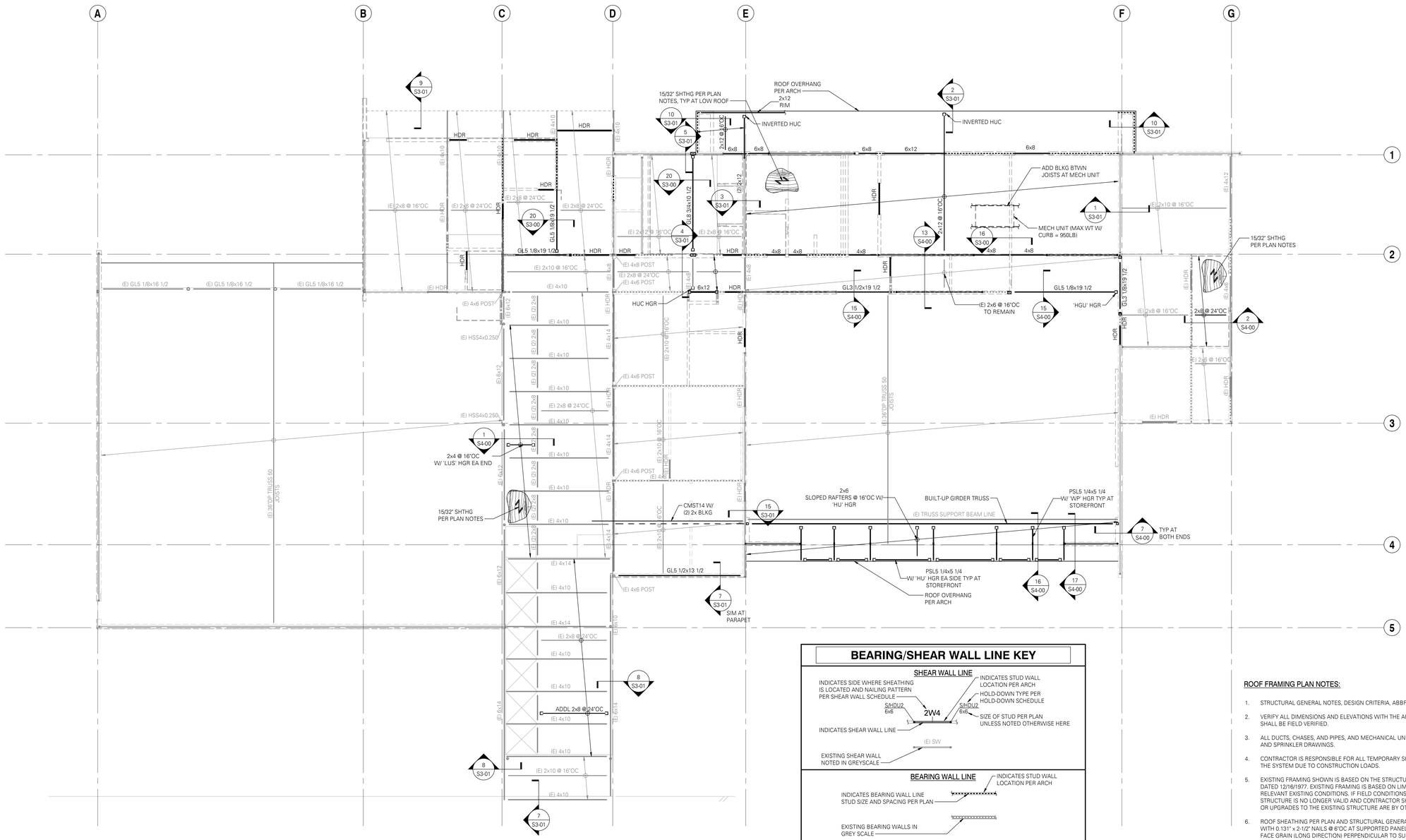

BEARING/SHEAR WALL LINE KEY

ROOF FRAMING PLAN NOTES:

1. STRUCTURAL GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND LEGEND PER S0-00 AND S0-01.
2. VERIFY ALL DIMENSIONS AND ELEVATIONS WITH THE ARCHITECTURAL DRAWINGS. ALL EXISTING DIMENSIONS SHALL BE FIELD VERIFIED.
3. ALL DUCTS, CHASES, AND PIPES, AND MECHANICAL UNITS SHALL BE PER MECHANICAL, PLUMBING, ELECTRICAL AND SPRINKLER DRAWINGS.
4. CONTRACTOR IS RESPONSIBLE FOR ALL TEMPORARY SHORING AND ALL TEMPORARY BRACING/STABILITY OF THE SYSTEM DUE TO CONSTRUCTION LOADS.
5. EXISTING FRAMING SHOWN IS BASED ON THE STRUCTURAL DRAWINGS BY BENITO A. SINCLAIR & ASSOCIATES DATED 12/16/1977. EXISTING FRAMING IS BASED ON LIMITED FIELD SURVEYS. CONTRACTOR SHALL VERIFY ALL RELEVANT EXISTING CONDITIONS. IF FIELD CONDITIONS DIFFER FROM WHAT IS SHOWN, ANALYSIS OF EXISTING STRUCTURE IS NO LONGER VALID AND CONTRACTOR SHALL CONTACT DCI ENGINEERS. ANY REINFORCEMENT OR UPGRADES TO THE EXISTING STRUCTURE ARE BY OTHERS.
6. ROOF SHEATHING PER PLAN AND STRUCTURAL GENERAL NOTES. SHEATHING TO BE NAILED TO ROOF FRAMING WITH 0.131" x 2-1/2" NAILS @ 6"OC AT SUPPORTED PANEL EDGES AND 12" OC FIELD, UNO. LAY SHEATHING WITH FACE GRAIN (LONG DIRECTION) PERPENDICULAR TO SUPPORTS AND STAGGER PANEL END JOINTS.
7. REMOVE EXISTING FIREPROOFING AS REQUIRED TO INSTALL NEW STRUCTURAL WORK. PATCH AND REPLACE FIREPROOFING TO MATCH EXISTING OR AS DIRECTED BY ARCHITECT.
8. HEADERS SHOWN BUT NOT SPECIFIED ARE TO BE (2) 2x8 MINIMUM UNO. HEADER SUPPORTS PER STUD AND SHEAR WALL PLAN.
9. BEAMS SUPPORTS ARE PER STUD AND SHEAR WALL PLAN. PROVIDE A35 CLIP EACH SIDE OF FLUSH BEAMS THAT BEAR ON DOUBLE TOP PLATES.
10. TYPICAL DETAILS PER:

16/S3-00	NON-STRUCTURAL PARTITION WALL CONNECTION
4/S3-00	TYPICAL HEADERS

ROOF FRAMING PLAN

SCALE: 1/8" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER — JAMES M. FU — 56283 — Exp. 6/30/25 — STRUCTURAL — STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

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ROOF FRAMING PLAN

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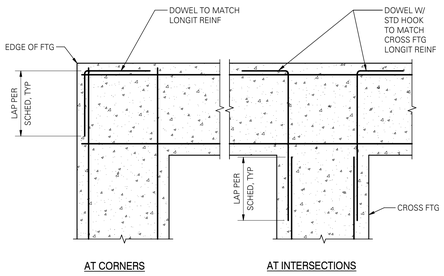


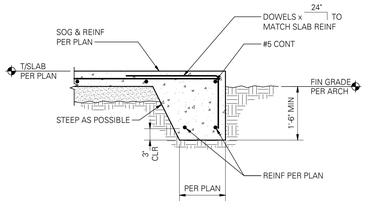
NOTE:

1. SPLICE LENGTHS PER LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE.

2. FOOTING REINFORCING PER PLAN OR ELEVATIONS, SECTIONS AND DETAILS.

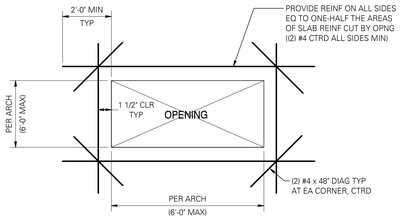
1 PLAN - TYPICAL CORNER REINFORCING AT CONCRETE FOOTINGS

SCALE: 3/4" = 1'-0" (03132)



2 TYPICAL THICKENED SLAB EDGE FOOTING

SCALE: 3/4" = 1'-0" (03203)



NOTES:

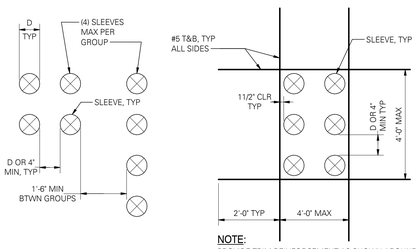
1. ALL OPENINGS WITH A DIMENSION OF 24" OR GREATER SHALL BE TRIMMED WITH REINFORCING.

2. REINFORCING IS IN ADDITION TO ANY REINFORCING INDICATED ON PLANS.

3. HOOK REINFORCING AT SLAB EDGE AS REQUIRED.

3 PLAN - TYPICAL SLAB OPENING REINFORCING AT SLAB ON GRADE

SCALE: 3/4" = 1'-0" (03220A)



NOTE:
PROVIDE TRIM REINFORCEMENT PER [03260] OR [03301] WHERE MINIMUM SPACING IS NOT MET.

PLAN - NO ADDITIONAL REINFORCEMENT

NOTE:
PROVIDE TRIM REINFORCEMENT AS SHOWN AROUND GROUPS OF (5) OR MORE SLEEVES. PROVIDE TRIM REINFORCEMENT PER [03260] OR [03301] WHERE MINIMUM SPACING IS NOT MET.

PLAN - ADDITIONAL REINFORCEMENT

NOTES:

1. ALUMINUM MATERIALS SHALL NOT BE EMBEDDED IN CONCRETE.

2. SLEEVES SHALL NOT BE LOCATED WITHIN 48" OF COLUMNS WITHOUT ENGINEER'S APPROVAL.

3. SLEEVES SHALL NOT INTERRUPT TYPICAL REINFORCEMENT INDICATED ON PLAN.

4. PROVIDE 2" MINIMUM CLEARANCE BETWEEN ALL POST-TENSIONING TENDONS.

4 PLANS - SLEEVES THRU CONCRETE SLAB

SCALE: 1/2" = 1'-0" (03261)

01400	GRADE 60 REINFORCING				
BAR SIZE	MISCELLANEOUS BARS		TOP BARS (see note #5)		HOOKED BARS
	Ld	Splice	Ld	Splice	Ldh
f'c = 4000psi					
#3	15	19	19	25	8
#4	19	25	25	33	10
#5	24	31	31	41	12
#6	29	37	37	49	15
#7	42	54	54	71	17
#8	48	62	62	81	19
#9	54	70	70	91	22
#10	61	79	79	102	25
#11	67	87	87	114	27
#14	81	N/A	105	N/A	33
#18	108	N/A	140	N/A	43
f'c = 5000psi					
#3	13	17	17	22	7
#4	17	23	23	29	9
#5	22	28	28	36	11
#6	26	34	34	44	13
#7	38	49	49	63	15
#8	43	56	56	72	17
#9	48	63	63	81	20
#10	54	71	71	92	22
#11	60	78	78	102	24
#14	72	N/A	94	N/A	29
#18	96	N/A	125	N/A	39

NOTES:

1. ALL TABULATED VALUES ARE IN INCHES.

2. VALUES FOR UNCOATED REINFORCING AND NORMAL WEIGHT CONCRETE WITH CLEAR SPACING > db, CLEAR COVER > db AND MINIMUM STIRRUPS OR TIES THROUGHOUT Ld OR CLEAR SPACING > 2db AND CLEAR COVER > db.

3. DEVELOP ALL REINFORCING IN STRUCTURAL SLABS WITH MINIMUM DEVELOPMENT LENGTH Ld.

4. Ldh = DEVELOPMENT LENGTH OF BAR WITH STANDARD HOOK.

5. TOP BAR = HORIZONTAL BAR WITH MORE THAN 12" OF FRESH CONCRETE BELOW OR AS NOTED ON DOCUMENTS AS "TOP BAR".

6. LAP SPLICE OF DIFFERENT SIZED BARS TO BE THE LARGER OF Ld OF THE LARGER BAR OR SPLICE LENGTH OF THE SMALLER BAR.

7. LAP SPLICE OF #14 AND #18 BARS IS NOT PERMITTED. LAP SPLICE OF SMALLER TO #14 AND #18 BARS IS NOT PERMITTED.

8. LAP SPLICE OF DIFFERENT GRADES OF REINFORCING TO BE THE LARGER OF Ld OF THE HIGHER GRADE BAR OR SPLICE LENGTH OF THE LOWER GRADE BAR.

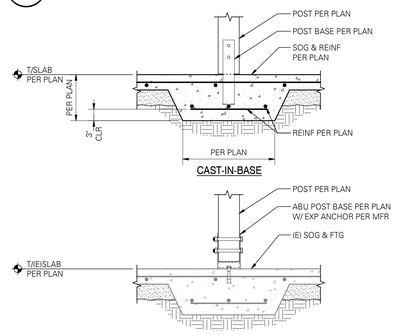
9. COLUMN VERTICAL REINFORCING LAP SPLICE SCHEDULE PER [01401].

10. SHEAR WALL REINFORCING LAP SPLICE SCHEDULE PER [01404].

11. MOMENT FRAME REINFORCING LAP SPLICE SCHEDULE PER [01405].

10 TYPICAL LAP SPLICE AND DEVELOPMENT LENGTH SCHEDULE

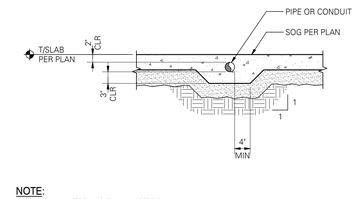
SCALE: 3/4" = 1'-0" (01400)



NOTE:
COLD JOINT BETWEEN FOOTING AND SLAB NOT PERMITTED.

6 WOOD POST BASE CONNECTION

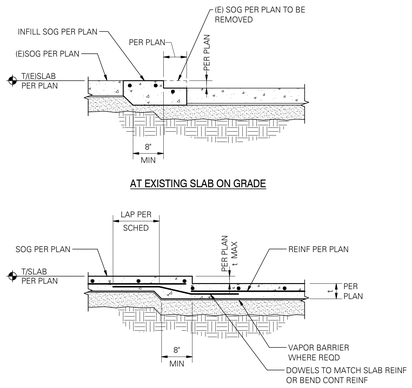
SCALE: 3/4" = 1'-0" (03010M)



NOTE:
ALUMINUM MATERIALS SHALL NOT BE EMBEDDED IN CONCRETE.

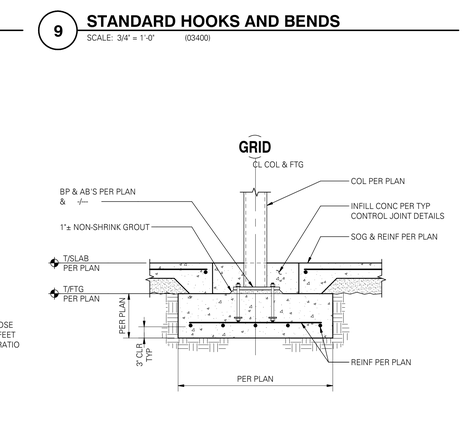
7 PIPE OR CONDUIT EMBEDDED IN SLAB ON GRADE

SCALE: 3/4" = 1'-0" (03204)



8 TYPICAL DEPRESSED SLAB DETAIL

SCALE: 3/4" = 1'-0" (03202)



NOTES:

1. CONSTRUCTION JOINT IS A JOINT BETWEEN DIFFERENT POURS. CONTROL JOINT IS A CRACK CONTROL JOINT WITHIN THE SAME POUR.

2. USE "EARLY ENTRY DRY-CUT SAW" AS SOON AS POSSIBLE WITHOUT CAUSING RAVELING OF CONCRETE EDGES. SAWCUT ALONG SHORT DIRECTION OF POUR FIRST.

3. ALIGN A CONSTRUCTION OR CONTROL JOINT WITH RE-ENTRANT SLAB CORNERS, EACH WAY, TYPICAL.

4. CONSTRUCTION/CONTROL JOINT TO ENCLOSE APPROXIMATE SQUARE AREAS 225 SQUARE FEET MAXIMUM, WITH MAXIMUM PANEL ASPECT RATIO OF 1.3 TO 1.0.

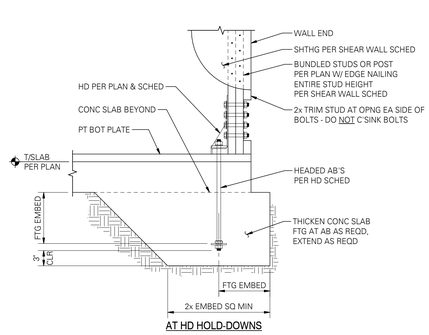
5. CONTRACTOR TO SUBMIT CONSTRUCTION/CONTROL JOINT PLAN TO STRUCTURAL ENGINEER OF RECORD FOR REVIEW/APPROVAL.

13 TYPICAL SLAB ON GRADE JOINT DETAILS WITH REINFORCING

SCALE: 3/4" = 1'-0" (03201)

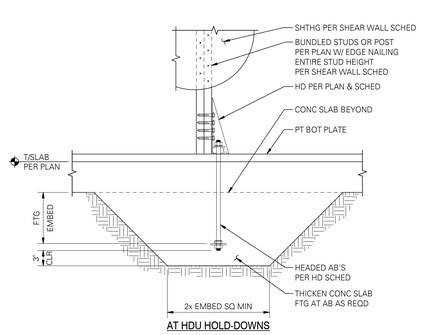
14 INTERIOR SPREAD FOOTING AT STEEL COLUMN

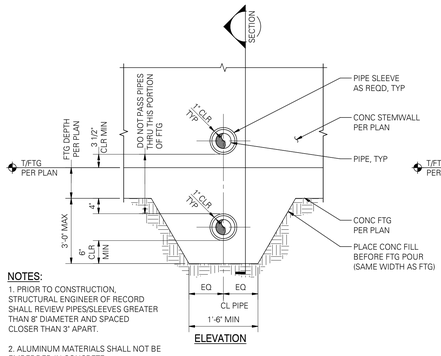
SCALE: 3/4" = 1'-0" (03005)



16 TYPICAL HOLD-DOWN AT THICKENED SLAB FOOTING

SCALE: 1" = 1'-0" (06093)





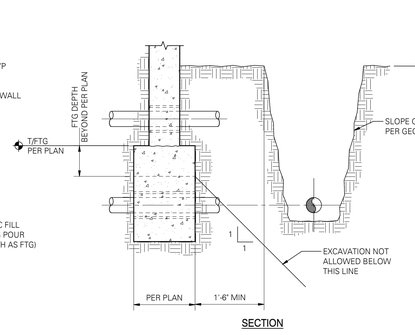
NOTES:

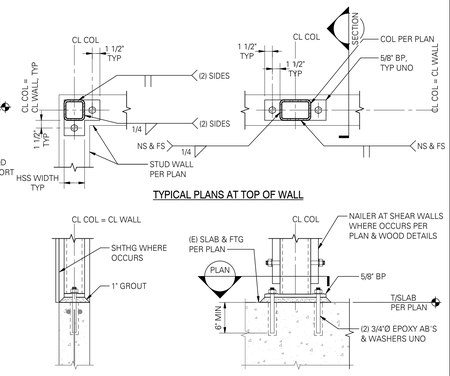
1. PRIOR TO CONSTRUCTION, STRUCTURAL ENGINEER OF RECORD SHALL REVIEW PIPES/SLEEVES GREATER THAN 8" DIAMETER AND SPACED CLOSER THAN 3" APART.

2. ALUMINUM MATERIALS SHALL NOT BE EMBEDDED IN CONCRETE.

18 TYPICAL PIPE AND TRENCH LOCATIONS AT CONCRETE STEMWALL/FOOTING

SCALE: 3/4" = 1'-0" (03190)





20 TYPICAL BASEPLATE TO EXISTING FOOTING WITHIN WOOD WALL

SCALE: 1" = 1'-0" (05032)

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REGISTERED PROFESSIONAL ENGINEER JAMES M. SUNDT 36283 Exp. 6/30/25 STRUCTURAL STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00
REVISIONS	

SEAL / SIGNATURE

JOB NO.	21071-0034
DRAWN	DCI
CHECK	SM

FOUNDATION DETAILS

SHEET
S2-00

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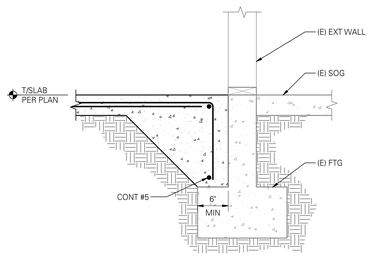
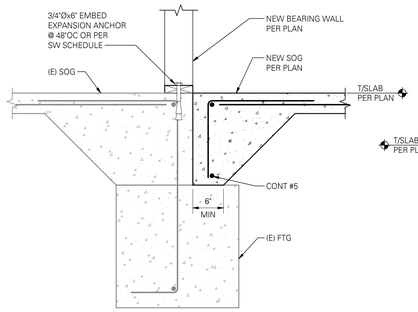


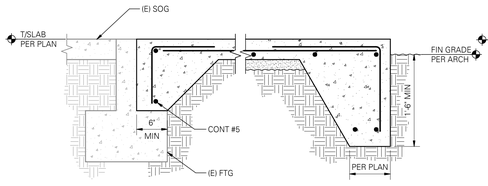
1 EXISTING EXTERIOR FOOTING TO NEW THICKENED SLAB EDGE

SCALE: 1" = 1'-0"



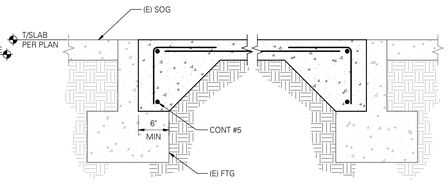
2 NEW BEARING WALL TO EXISTING EDGE FOOTING

SCALE: 1" = 1'-0"



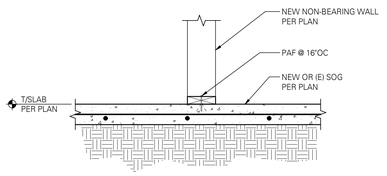
3 NEW BEARING WALL TO EXISTING EDGE FOOTING

SCALE: 1" = 1'-0"



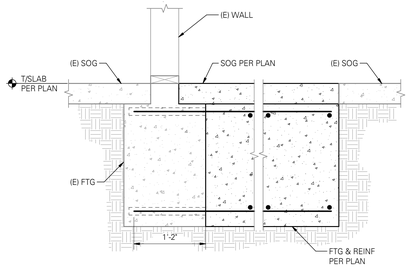
4 SLAB INFILL TO EXISTING FOOTING

SCALE: 1" = 1'-0"



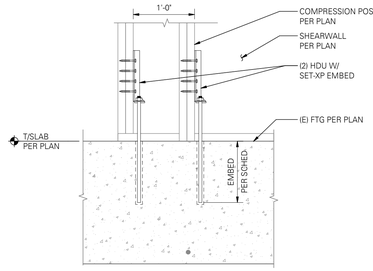
5 NEW NON-BEARING WALL TO SLAB ON GRADE

SCALE: 1" = 1'-0"



7 NEW ISOLATED FOOTING TO CONTINUED FOOTING

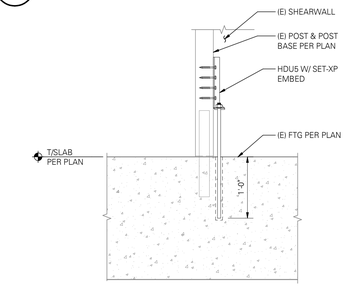
SCALE: 1" = 1'-0"



HOLD-DOWN	AB	EMBED
DTT1Z	3/8"Ø	4"
DTT2Z	1/2"Ø	6"
HDU2	5/8"Ø	8"
HDU8	7/8"Ø	15"

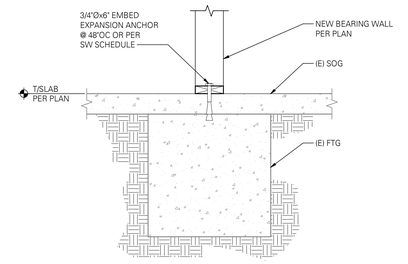
8 (2) HDU AT END OF EXISTING SHEARWALL

SCALE: 1" = 1'-0"



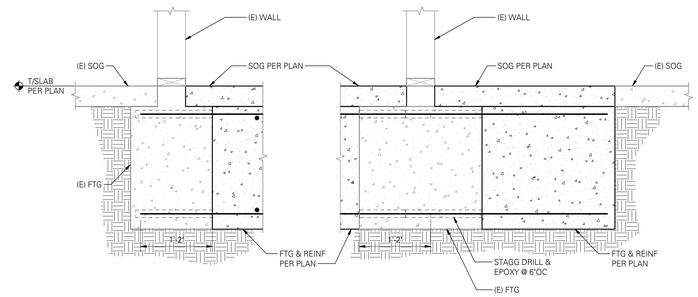
9 HDU AT END OF EXISTING SHEARWALL WITH POST BASE

SCALE: 1" = 1'-0"



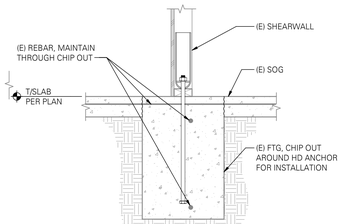
10 EXISTING INTERIOR FOOTING TO NEW BEARING WALL

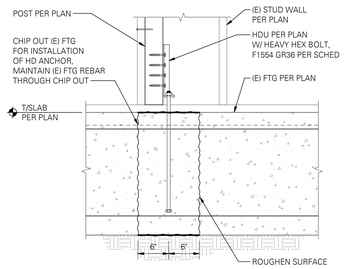
SCALE: 1" = 1'-0"



13 NEW ISOLATED FOOTING TO CONTINUED FOOTING

SCALE: 1" = 1'-0"



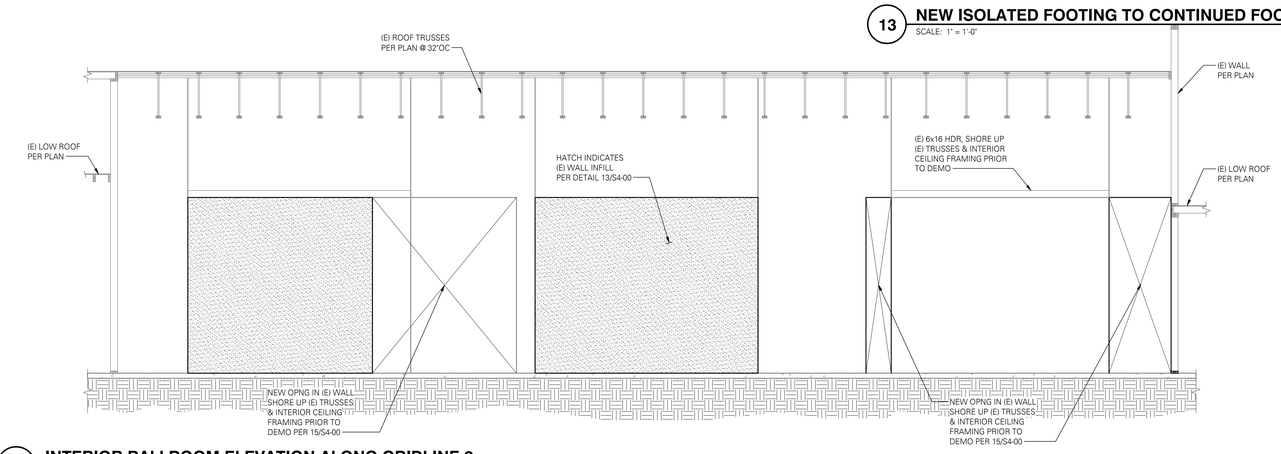


HOLD-DOWN	AB	EMBED
HDU5	5/8"Ø	8"
HDU11	1"Ø	14"

NOTE:
WHERE EXISTING BARS ARE NOT MAINTAINED THROUGH CHIP OUT, PROVIDE #4 HOOKED BARS WITH 6" EPOXY T&B, EA END.

20 HDU5 AND HDU11 AT EXISTING SHEARWALL

SCALE: 1" = 1'-0"



16 INTERIOR BALLROOM ELEVATION ALONG GRIDLINE 2

SCALE: 1/4" = 1'-0"

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56283
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BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

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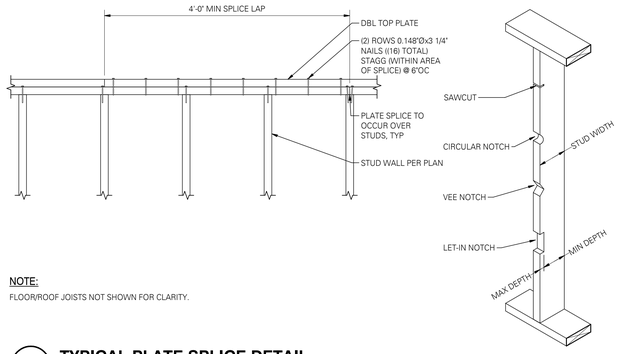
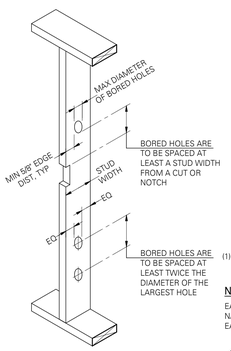


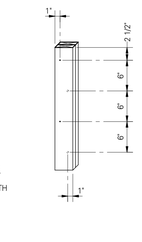
NOTE:

FLOOR/ROOF JOISTS NOT SHOWN FOR CLARITY.

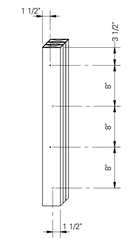
1 TYPICAL PLATE SPLICE DETAIL

SCALE: 1" = 1'-0" (06904)

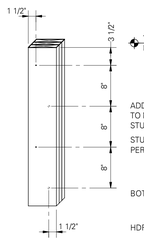




(2) 2x4 LAMINATIONS W/ (1) ROW OF 0.148"Ø x3 1/2" NAILS, STAGGERED



(3) 2x4 LAMINATIONS W/ (1) ROW OF 0.148"Ø x3 1/2" NAILS, EA LAYER, STAGGERED BTWN LAYERS EA SIDE



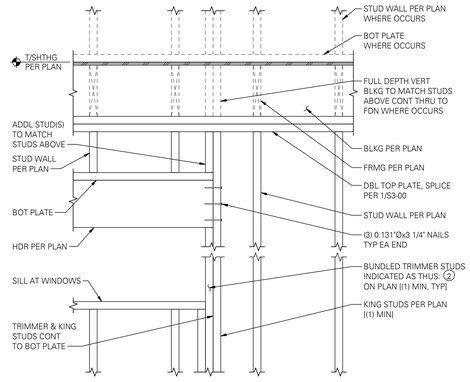
(3) 2x6 LAMINATIONS W/ (2) ROWS OF 0.148"Ø x3 1/2" NAILS, EA LAYER, STAGGERED BTWN LAYERS EA SIDE

NOTE:

EACH ADDITIONAL LAMINATION OVER (3) LAMINATIONS SHALL BE NAILED TO THE ASSEMBLY W/ 0.148"Ø x3 1/4" NAILS, STAGGERED EACH SIDE OF BUNDLED STUDS.

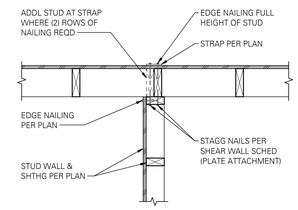
3 TYPICAL NAILING FOR BUNDLED STUDS

SCALE: 1" = 1'-0" (06914)

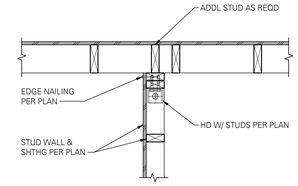


4 TYPICAL HEADER

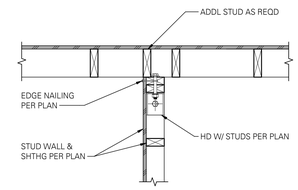
SCALE: 1" = 1'-0" (06210)



WITH OR WITHOUT STRAP TIE



HDU HOLD-DOWNS



HD HOLD-DOWNS

NOTES:

[1] SOME HOLD-DOWN TYPES MAY NOT BE USED ON THIS PROJECT.

[2] TYPICAL HOLD-DOWN DETAILS PER 12/S3-00. ANCHOR REINFORCEMENT REQUIRED AT STEMWALLS.

[3] PROVIDE PANEL EDGE NAILING PER SHEAR WALL SCHEDULE AT HOLD-DOWN STUDS/POSTS.

[4] BASED ON MINIMUM f'c = 3000 PSI CONCRETE.

[5] STEMWALLS SHALL BE 8" WIDE x 18" TALL MINIMUM.

[6] CAST-IN-PLACE (CIP) TYPE THREADED RODS AT HOLD-DOWNS SHALL HAVE TWO HEX HEAD NUTS WITH OVERSIZED WASHERS.

[7] INCLUDES 1.6 LOAD DURATION INCREASE FOR WOOD.

[8] BASED ON 11 7/8" DEEP FLOOR JOIST.

[9] TOTAL NAILS SPECIFIED, USE HALF THE NAILS AT THE STUDS ABOVE AND BELOW LEVEL BEING CONNECTED.

[10] AT PRESSURE TREATED SILLS, USE HOT DIPPED GALVANIZED BOLTS.

[11] POST INSTALLED HOLD-DOWN OPTIONS MAY BE AVAILABLE AT SOME CONDITIONS. CONTACT ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

[12] NAIL LAMINATE MULTIPLE 2x STUDS WITH PLATE NAILING PER SHEAR WALL SCHEDULE.

[13] MIDWALL/CORNER
WALL END

[14] STUD WALLS SHALL BE 2x6, CENTER HOLD-DOWN IN STUD WALL.

BEARING WALL STUDS		
STUD SIZE	MAX DEPTH OF EDGE CUT OR NOTCH	MIN DEPTH REMAINING AFTER CUT OR NOTCH
2x4	7/8"	2 5/8"
2x6	1 3/8"	4 1/8"

BEARING WALL STUDS		
STUD SIZE	MAX DIAMETER OF BORED HOLE	MIN DEPTH REMAINING AFTER BORED HOLE
2x4	1 3/8"	5/8" EA SIDE OF HOLE
2x6	2 3/16"	5/8" EA SIDE OF HOLE

NOTE:
STUDS MAY NOT BE BORED IN EXCESS OF 40% OF THE STUD. IF STUDS ARE DOUBLED, BORINGS MAY BE INCREASED TO 60% OF STUD WIDTH PROVIDED NOT MORE THAN (2) SUCCESSIVE STUDS ARE BORED. BORINGS SHALL NOT BE MADE AT THE SAME SECTION WHERE CUT OR NOTCH HAS BEEN MADE.

NON-BEARING WALL STUDS		
STUD SIZE	MAX DEPTH OF EDGE CUT OR NOTCH	MIN DEPTH REMAINING AFTER CUT OR NOTCH
2x4	1 3/8"	2 1/8"
2x6	2 3/16"	3 3/8"

NON-BEARING WALL STUDS		
STUD SIZE	MAX DIAMETER OF BORED HOLE	MIN DEPTH REMAINING AFTER BORED HOLE
2x4	2 1/16"	5/8" EA SIDE OF HOLE
2x6	3 1/4"	5/8" EA SIDE OF HOLE

NOTE:
STUDS MAY NOT BE BORED IN EXCESS OF 60% OF THE STUD. BORINGS SHALL NOT BE MADE AT THE SAME SECTION WHERE CUT OR NOTCH HAS BEEN MADE.

CUTTING AND NOTCHING WOOD STUDS

NOTE:
DO NOT NOTCH MORE THAN THREE ADJACENT STUDS WITHOUT REVIEW BY ENGINEER.

BORED HOLES IN WOOD STUDS

NOTE:
BORED HOLE NOT PERMITTED IN MORE THAN THREE ADJACENT STUDS WITHOUT REVIEW BY ENGINEER.

01420

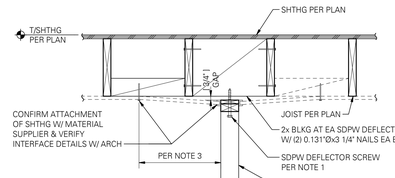
HOLD-DOWN/STRAP SCHEDULE - DOUG-FIR STUDS

[1, 2, 7, 11] INDICATES FOOTNOTES

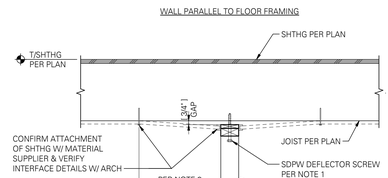
	TYPE	NUMBER OF STUDS/POST [3, 12]	NAILS, SCREWS OR BOLTS	ANCHOR [4] DIAMETER [10]	CONCRETE EMBEDMENT/CAPACITY STEMWALL [5] EMBED CIP [6, 14]	STEMWALL [5] CAPACITY	FOOTING EMBED CIP [6]	FOOTING CAPACITY	NOTES
WOOD TO CONCRETE	HDU2	(2) 2x	(6) SDS1/4x2 1/2	5/8"Ø	10"	3.1k	8"	3.1k	----
	HDU4	(2) 2x	(10) SDS1/4x2 1/2	5/8"Ø	10"	4.6k	8"	4.6k	----
	HDU5	(2) 2x	(14) SDS1/4x2 1/2	5/8"Ø	10"	5.2k	8"	5.6k	----
	HDU8	(3) 2x	(20) SDS1/4x2 1/2	7/8"Ø	10"	6.9k	10"	7.9k	----
	HDU11	(1) 4x6 OR (1) 6x	(30) SDS1/4x2 1/2	1"Ø	10"	7.8k	12"	9.5k	----
	HDU14	(1) 6x	(36) SDS1/4x2 1/2	1"Ø	10"	7.8k	15"	13.6k	----
	HD12	(1) 6x6	(4) 1"Ø	1 1/8"Ø	10"	8.6k	15"	15.5k	----
	HD19	(1) 6x6	(5) 1"Ø	1 1/4"Ø	10"	9.5k	18"	19k	----

9 HOLD-DOWN/STRAP SCHEDULE - DOUG-FIR STUDS

SCALE: 1" = 1'-0" (01420M)



WALL PARALLEL TO ROOF FRAMING



WALL PERPENDICULAR TO ROOF FRAMING

WALL TO ROOF FRAMING CONNECTIONS - DTC OPTION (ROOF ONLY)

WALL PARALLEL TO FLOOR FRAMING

NOTE:
AT CONTRACTORS OPTION:
DTC CLIP CONNECTION OF WALL TO ROOF FRAMING IS PERMITTED PER FRAMING DETAILS SHOWN ABOVE.

WALL PERPENDICULAR TO FLOOR FRAMING

WALL TO FLOOR/ROOF FRAMING CONNECTIONS

NOTES:

1. CONTRACTOR TO REFERENCE SDPW DEFLECTOR SCREW SPECIFICATIONS IN REGARDS TO PRODUCT TYPE AT 1x AND 2x TOP PLATES OR (2) 2x TOP PLATES. FOR 1x AND 2x TOP PLATES A MAXIMUM SPACING EQUALS 42"OC AND FOR (2) 2x TOP PLATES A MAXIMUM SPACING EQUALS 48"OC. SDPW DEFLECTOR SCREWS MUST BE PLACED AT MINIMUM 6" FROM EACH END OF WALL. INSTALL WITH 3/4" OFFSET BELOW BOTTOM OF PLATE AND HEAD OF SDPW DEFLECTOR SCREW.

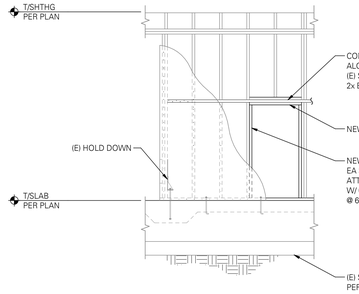
2. DCI ENGINEERS IS ONLY RESPONSIBLE FOR THE POSITIVE CONNECTION (DTC CLIP AND SDPW DEFLECTOR SCREW) FROM THE NONBEARING WALL TO THE PRIMARY STRUCTURE. THE CONTRACTOR IS TO CONFIRM THE ATTACHMENT OF THE CEILING SHEATHING TO THE NONBEARING WALL WITH THE SUB-CONTRACTOR PERFORMING THE FRAMING, THE ARCHITECT, THE MATERIAL SUPPLIER, AND THE ACOUSTICAL CONSULTANT AS THERE ARE VARIOUS CONSIDERATIONS INCLUDING MATERIAL ATTACHMENT SPECIFICATIONS, PREFERENTIAL FRAMING TECHNIQUES BY THE SUB-CONTRACTOR, FIRE RATING AND ACOUSTICAL CAULKING REQUIREMENTS, AND NONBEARING WALL FINISH INTERFACE REQUIREMENTS. ALL OF WHICH ARE OUTSIDE OF DCI ENGINEERS EXPERTISE.

3. 16" MINIMUM, 24" MAXIMUM. CONFIRM SPACING OF CONNECTION WITH MATERIAL SUPPLIER, MATERIAL SUPPLIER TO ACCOUNT FOR MOVEMENT OF STRUCTURE.

4. 1x TOP PLATE CAN BE REMOVED GIVEN THE GAP IS 1/2" MAXIMUM.

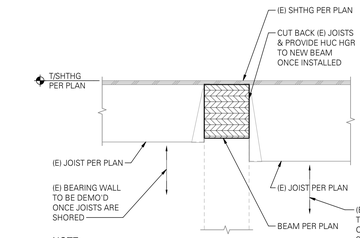
10 PLAN - INTERSECTING SHEAR WALLS

SCALE: 1" = 1'-0" (06111)



15 EXISTING SHEAR WALL WITH NEW DOOR OPENING

SCALE: 1" = 1'-0"



NOTE:
CONTRACTOR TO SHORE (E) JOISTS PRIOR TO REMOVING BEARING WALL

01430

SHEAR WALL SCHEDULE W6 FOR 0.131"Ø x 2 1/2" NAILS IN DOUG-FIR/SOUTHERN PINE (2018 IBC) [17]

~~SOME SHEAR WALL TYPES NOTED MAY NOT BE USED~~ ON THIS PROJECT.

WALL TYPE	WALL SHEATHING APA-RATED [1, 2, 12, 13]	NAIL SIZE & SPACING AT ALL PANEL EDGES [4, 5]	BLOCKING & STUD SIZE AT ADJOINING PANEL EDGES [3, 6, 14]	RIM JOIST OR BLOCKING CONN TO TOP PLATE BELOW [7, 8]	2x PLATE ATTACHMENT NAILING TO WOOD RIM JOIST OR BLOCKING BELOW	SILL PLATE ATTACHMENT ANCHOR BOLT TO CONCRETE BELOW [10]	SILL PLATE AT FOUNDATION [11]	SHEAR CAPACITY LBS/FT
W6	15/32"	0.131"Ø x2 1/2" @ 6"OC	2x	CLIP @ 16"OC	0.148"Ø x3 1/4" @ 8"OC	5/8"Ø @ 48"OC	2x	260
W4	15/32"	0.131"Ø x2 1/2" @ 4"OC	2x	CLIP @ 16"OC	0.148"Ø x3 1/4" @ 6"OC	5/8"Ø @ 48"OC	2x	350
W3	15/32"	0.131"Ø x2 1/2" @ 3"OC STAGGERED	3x	CLIP @ 12"OC	0.148"Ø x3 1/4" @ 4"OC	5/8"Ø @ 32"OC	2x	490
W2	15/32"	0.131"Ø x2 1/2" @ 2"OC STAGGERED	3x	CLIP @ 16"OC EACH SIDE	0.148"Ø x3 1/4" @ 6"OC (2) ROWS [9]	5/8"Ø @ 24"OC	2x	640

NOTES:

[1] INSTALL PANELS EITHER HORIZONTALLY OR VERTICALLY.

[2] WHERE SHEATHING IS APPLIED ON BOTH SIDES OF WALL, PANEL EDGE JOINTS ON 2x FRAMING SHALL BE STAGGERED SO THAT JOINTS ON THE OPPOSITE SIDES ARE NOT LOCATED ON THE SAME STUD.

[3] BLOCKING IS REQUIRED AT ALL PANEL EDGES.

[4] PROVIDE SHEAR WALL SHEATHING AND NAILING FOR THE ENTIRE LENGTH OF THE WALLS INDICATED ON THE PLANS. ENDS OF FULL HEIGHT WALLS ARE DESIGNATED BY WINDOWS OR DOORWAYS OR AS DESIGNATED ON PLANS. HOLD-DOWN REQUIREMENTS PER PLANS. ALTERNATE NOTE: WALLS SHOWN WITH HORIZONTAL STRAPS BELOW AND/OR ABOVE OPENINGS REQUIRE SHEATHING, SHEAR WALL NAILING, ETC ABOVE AND BELOW ALL OPENINGS).

[5] SHEATHING EDGE NAILING IS REQUIRED AT ALL HOLD-DOWN POSTS. EDGE NAILING MAY ALSO BE REQUIRED TO EACH STUD USED IN BUILT-UP HOLD-DOWN POSTS. ADDITIONAL INFORMATION PER HOLD-DOWN DETAILS.

[6] INTERMEDIATE FRAMING TO BE 2x MINIMUM MEMBERS. ATTACH SHEATHING TO INTERMEDIATE FRAMING WITH 0.131"Ø x2 1/2" NAILS AT 12"OC WHERE STUDS ARE SPACED AT 16"OC AND 0.131"Ø x2 1/2" NAILS AT 6"OC WHERE STUDS ARE SPACED AT 24"OC.

[7] BASED ON 0.131"Ø x1 1/2" NAILS USED TO ATTACH FRAMING CLIPS DIRECTLY TO FRAMING. USE 0.131"Ø x2 1/2" NAILS WHERE INSTALLED OVER SHEATHING.

[8] FRAMING CLIPS: A35 OR LTP5 OR APPROVED EQUIVALENT.

[9] WHERE BOTTOM PLATE ATTACHMENT SPECIFIES (2) ROWS OF NAILS OR SCREWS, PROVIDE DOUBLE JOIST, RIM JOIST OR EQUAL BELOW. STAGGER NAILS/SCREWS IN ROWS 1 1/2" APART MINIMUM.

[10] ANCHOR BOLTS SHALL BE PROVIDED WITH HOT-DIPPED GALVANIZED STEEL PLATE WASHERS 0.229"x3"x3" MINIMUM. THE HOLE IN THE PLATE WASHER MAY BE DIAGONALLY SLOTTED 13/16"x1 3/4" PROVIDED A STANDARD CUT WASHER IS PLACED BETWEEN THE PLATE WASHER AND NUT. PLATE WASHER TO EXTEND TO WITHIN 1/2" OF THE EDGE OF THE SILL PLATE ON THE SIDE(S) WITH SHEATHING. AT 2x6 WALLS WITH SHEATHING ON BOTH SIDES USE PLATE WASHER 0.229"x4 1/2"x4 1/2" MINIMUM. EMBED ANCHOR BOLTS 7" MINIMUM INTO THE CONCRETE.

[11] PRESSURE TREATED MATERIAL CAN CAUSE EXCESSIVE CORROSION IN THE FASTENERS. PROVIDE HOT-DIPPED GALVANIZED (ELECTRO-PLATING IS NOT ACCEPTABLE) NAILS AND CONNECTOR PLATES (FRAMING ANGLES, ETC) FOR ALL CONNECTORS IN CONTACT WITH PRESSURE TREATED FRAMING MEMBERS. ADDITIONAL INFORMATION PER STRUCTURAL GENERAL NOTES.

[13] WHERE WOOD SHEATHING (W) IS APPLIED OVER GYPSUM SHEATHING (G), CONTACT THE ENGINEER OF RECORD FOR ALTERNATE NAILING REQUIREMENTS.

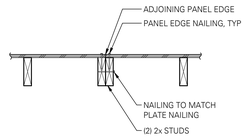
[14] AT ADJOINING PANEL EDGES, (2) 2x STUDS NAILED TOGETHER MAY BE USED IN PLACE OF SINGLE 3x STUD. DOUBLE 2x STUDS SHALL BE CONNECTED TOGETHER BY NAILING THE STUDS TOGETHER WITH 3" LONG NAILS OF THE SAME SPACING AND DIAMETER AS THE PLATE NAILING, PER SECTION.

[15] CONTACT THE STRUCTURAL ENGINEER OF RECORD FOR ADHESIVE OR EXPANSION BOLT ALTERNATIVES TO CAST-IN-PLACE ANCHOR BOLTS. SPECIAL INSPECTION MAY BE REQUIRED.

[16] NAIL STUDS TO 3x SILL PLATES WITH EITHER (2) 0.148"Ø x4" END NAILS OR (4) 0.131"Ø x2 1/2" TOENAILS.

[17] WX WHERE "W" INDICATES WOOD SHEATHING AND "X" INDICATES EDGE NAIL SPACING.

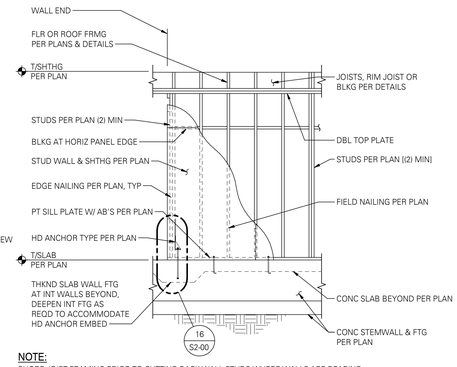
[18] EDGE NAILS SHALL BE LOCATED 3/8" FROM PANEL EDGES.



PLAN

7 TYPICAL HOLES & NOTCHES IN WOOD STUDS

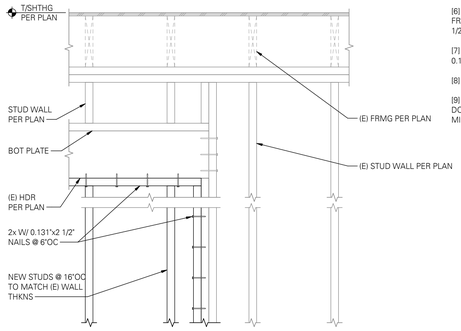
SCALE: 1" = 1'-0" (06908)



NOTE:
SHORE JOIST FRAMING PRIOR TO CUTTING BACK WALL STUDS WHERE WALLS ARE BEARING.

12 TYPICAL SHEAR WALL ELEVATION

SCALE: 1" = 1'-0" (06090)



16 NON-STRUCTURAL PARTITION WALL CONNECTION

SCALE: 1" = 1'-0" (06905A)

17 EXISTING HEADER INFILL DETAIL

SCALE: 1" = 1'-0" (06210M)

18 SHEAR WALL SCHEDULE - DOUG-FIR/SOUTHERN PINE

SCALE: 1" = 1'-0" (01430)

20 TYPICAL PURLIN TO BEAM CONNECTION

SCALE: 1" = 1'-0" (06203M)

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REGISTERED PROFESSIONAL ENGINEER — JAMES M. T. — 36283 — Exp. 6/30/25 — STRUCTURAL — STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

X REVISIONS

SEAL / SIGNATURE

JOB NO.	21071-0034
DRAWN	DCI
CHECK	SM

FRAMING DETAILS

SHEET
S3-00

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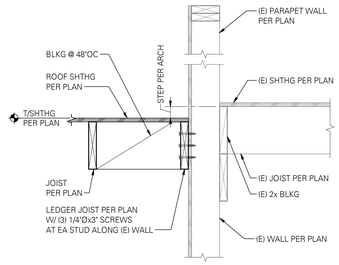
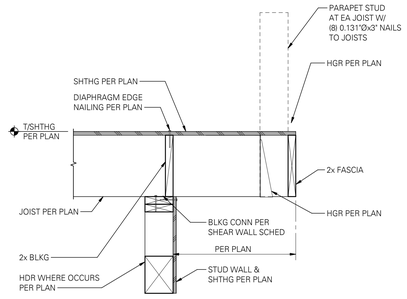


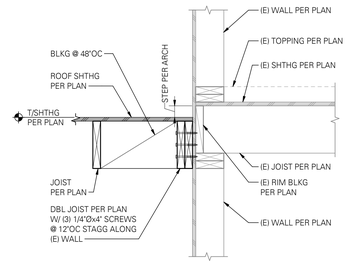
1 NEW ROOF FRAMING TO EXISTING MAINTENANCE STORAGE WALL

SCALE: 1" = 1'-0"



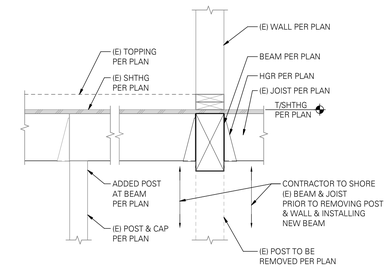
2 EXTERIOR WALL PERPENDICULAR TO CANTILEVERED ROOF JOISTS

SCALE: 1" = 1'-0" (06002A)



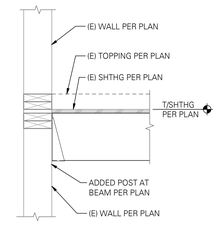
3 NEW ROOF FRAMING TO EXISTING RESTROOM WALL

SCALE: 1" = 1'-0"



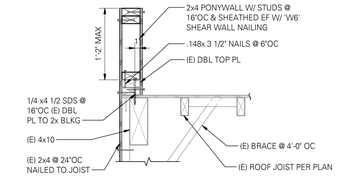
4 NEW GLULAM BEAM TO EXISTING INTERIOR WALL AND EXISTING BEAM POST REMOVAL

SCALE: 1" = 1'-0"



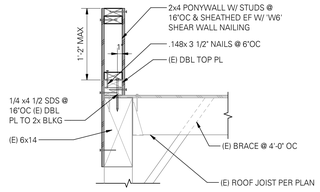
5 NEW GLULAM BEAM TO EXISTING INTERIOR WALL

SCALE: 1" = 1'-0"



7 EXISTING ROOF EDGE WITH ADDED PARAPET FRAMING

SCALE: 1" = 1'-0"



8 EXISTING ROOF EDGE WITH ADDED PARAPET FRAMING

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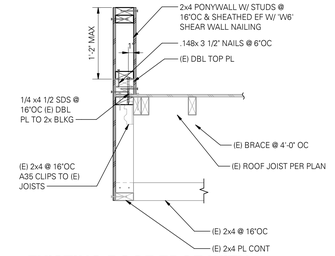
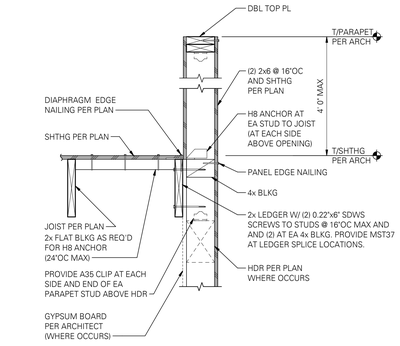


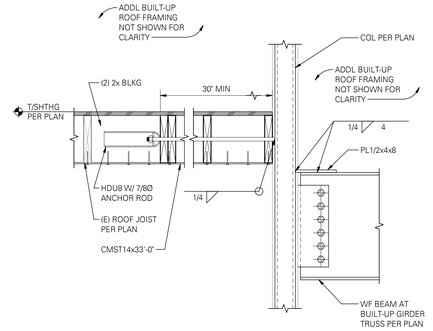
9 EXISTING ROOF EDGE WITH ADDED PARAPET FRAMING

SCALE: 1" = 1'-0"



10 PARAPET - EXTERIOR WALL PARALLEL TO JOIST

SCALE: 1" = 1'-0" (4/SD10.21)



15 DIAPHRAGM DRAG CONNECTION AT EXISTING ROOF

SCALE: 1" = 1'-0" (06062)

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REGISTERED PROFESSIONAL ENGINEER JAMES MEL 36283 Exp. 6/30/25 STRUCTURAL STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00
REVISIONS	
1 PCR1	06.28.24

SEAL / SIGNATURE

JOB NO.	21071-0034
DRAWN	DCI
CHECK	SM

FRAMING DETAILS

SHEET
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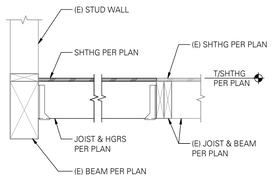
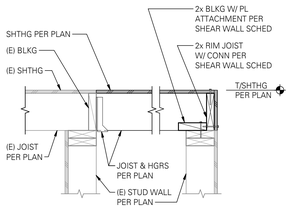


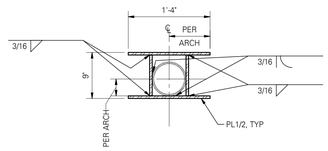
1 ROOF INFILL FRAMING AT EXISTING OPENING

SCALE: 1" = 1'-0"



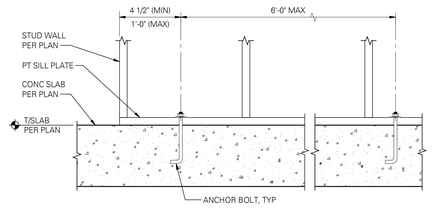
2 ROOF INFILL FRAMING AT EXISTING OPENING

SCALE: 1" = 1'-0"



3 PLATE TO EXISTING COLUMN

SCALE: 1" = 1'-0"

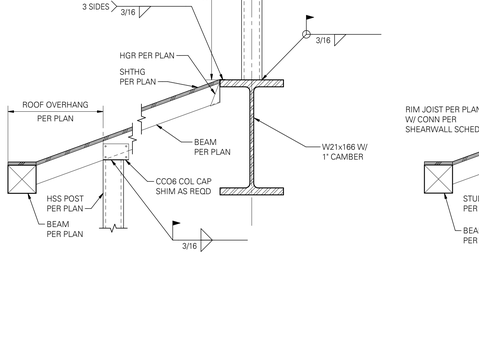


4 TYPICAL SILL PLATE ANCHORAGE TO CONCRETE

SCALE: 1" = 1'-0" (0691O)

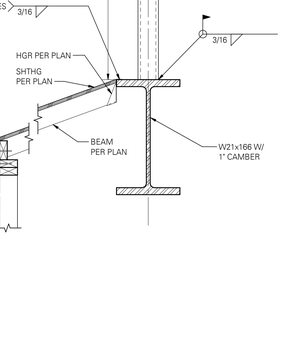
NOTES:

1. USE 5/8"Ø ANCHOR BOLTS WITH 7" MINIMUM EMBEDMENT INTO CONCRETE SLAB.
2. EACH SILL PLATE PIECE SHALL HAVE (2) BOLTS MINIMUM. HOLD-DOWN ANCHORS ARE NOT TO BE CONSIDERED AN ANCHOR BOLT.
3. LOCATE BOLTS WITHIN 1'-0" OF SILL PLATE PIECE ENDS AND AT 6'-0"OC MAXIMUM.
4. USE PLATE WASHER PER SHEAR WALL SCHEDULE AT EACH BOLT. STANDARD CUT WASHERS ARE ACCEPTABLE AT NON-SHEAR WALLS.
5. DO NOT DRILL OVERSIZE HOLES THRU SILL PLATE. USE 11/16"Ø DRILL BIT.
6. SILL PLATE THICKNESS AND FASTENING AT SHEAR WALLS PER SHEAR WALL SCHEDULE.
7. CONTACT THE ENGINEER-OF-RECORD FOR POST INSTALLED ANCHOR OPTIONS.



6 EXISTING POST REMOVAL ALONG GRID LINE 2

SCALE: 1" = 1'-0"



7 TRUSS TO HSS CONNECTION

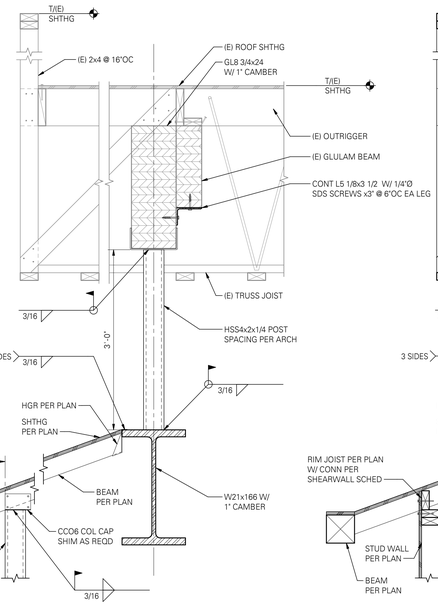
SCALE: 1" = 1'-0"

13 LOW ROOF SECTION AT EXISTING PARAPET

SCALE: 1" = 1'-0"

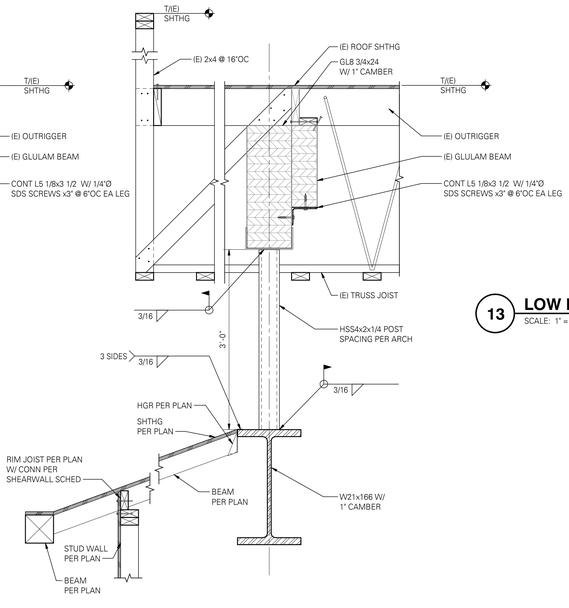
15 SECTION AT REMOVED WALL ALONG GRIDLINE 2

SCALE: 1" = 1'-0"



16 SECTION AT GLULAM BEAM AND TRUSS

SCALE: 1" = 1'-0"



17 SECTION AT GLULAM BEAM AND TRUSS

SCALE: 1" = 1'-0"

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REGISTERED PROFESSIONAL ENGINEER
SCOTT JAMES MURPHY
56283
Exp. 6/30/25
STRUCTURAL
STATE OF CALIFORNIA

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

BID SET	06.03.25
ADDITIONAL DATE (OPT)	00.00.00

X REVISIONS

SEAL / SIGNATURE

JOB NO.	21071-0034
DRAWN	DCI
CHECK	SM

STEEL DETAILS

SHEET
S4-00

BOLTED SINGLE SHEAR PLATE CONNECTION - SCHEDULE "A"									
3/4"Ø - A325-N		SINGLE ROW		BEAM Fy=50KSI - CONNECTION PLATE Fy=36KSI			CONNECTION CAPACITY-LRFD [ASD] (3) (KIPS)		
BEAM SIZE	"N" BOLTS REQUIRED (1)	SHEAR PLATE OR WT STEM THICKNESS	MIN HSS COLUMN WALL THICKNESS (8)	WELD SIZE t	MAX SINGLE COPE DEPTH (7)	MAX DOUBLE COPE DEPTH (7)	UNCOPED	COPED	
								SINGLE	DOUBLE
C8,C9,C10	2	5/16"	1/4"	1/4"	1 1/4"	*NR (9)*	21.5 [14.3]	21.5 [14.3]	*NR (9)*
W8	2	5/16"	1/4"	1/4"	1 1/4"	*NR (9)*	21.5 [14.3]	14.7 [9.8]	*NR (9)*
W10	2	5/16"	1/4"	1/4"	2 1/2"	1 1/4"	21.5 [14.3]	19.2 [12.8]	16.6 [11.0]
C12,C15	3	5/16"	1/4"	1/4"	2"	1 1/4"	42.0 [28.0]	42.0 [28.0]	40.9 [27.2]
W12	3	5/16"	1/4"	1/4"	2"	1 1/4"	41.7 [27.8]	30.8 [20.5]	25.1 [16.7]
W14	3	5/16"	1/4"	1/4"	2 1/2"	1 1/2"	42.0 [28.0]		
W16	4	5/16"	1/4"	1/4"	2 1/2"	1 1/2"	61.3 [40.9]		
W18	5	5/16"	1/4"	1/4"	2 1/2"	1 1/2"	80.2 [53.5]	*EQUAL TO UNCOPED CAPACITY*	*EQUAL TO UNCOPED CAPACITY*
W21	6	5/16"	1/4"	1/4"	2 1/2"	1 1/2"	84.5 [56.4]		
W24	7	5/16"	1/4"	1/4"	2 1/2"	1 1/2"	104.0 [69.3]		
W27	8	5/16"	1/4"	1/4"	2 1/2"	*NR (9)*	123.1 [82.1]		*NR (9)*
W30	8	5/16"	1/4"	1/4"	2 1/2"	*NR (9)*	123.1 [82.1]		*NR (9)*
W33	9	5/16"	1/4"	1/4"	2 1/2"	*NR (9)*	142.2 [94.8]		*NR (9)*
W36	10	5/16"	1/4"	1/4"	2 1/2"	*NR (9)*	158.3 [105.5]		*NR (9)*

BOLTED SINGLE ROW SHEAR PLATE CONNECTION NOTES:

1. PROVIDE EITHER STANDARD OR HORIZONTAL SHORT SLOTTED HOLES AS PERMITTED BY AISC J3.2 IN THE BEAM WEB AND/OR THE SHEAR PLATE.

2. WHERE SHORT-SLOTTED HOLES ARE USED, PROVIDE HARDENED WASHERS PER AISC J3.2.

3. CAPACITIES BASED ON AISC 15TH EDITION WITH ASTM A325-N BOLTS.

4. HORIZONTAL DISTANCE FROM SUPPORT FACE TO CENTERLINE OF BOLT GROUP SHALL BE AS SHOWN IN DETAIL, BUT SHALL NOT EXCEED 3 1/2" IN THE AS-BUILT CONDITION. SUPPORT FACE FOR TEE IS THE INSIDE FACE OF FLANGE.

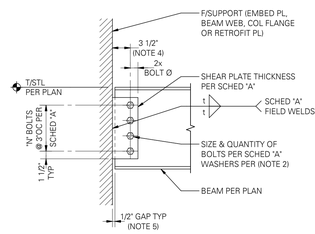
5. GAP BETWEEN BEAM END AND SUPPORT FACE SHALL BE 1/2" EXCEPT FOR "WT" CONNECTORS USED WITH HSS COLUMNS. WHERE "WT" ARE USED AS SHEAR TAB ELEMENTS, THE GAP BETWEEN FACE OF COLUMN AND END OF BEAM SHALL NOT EXCEED THE LESSER OF 1 1/2" OR THE "k" DISTANCE OF THE "WT" PLUS 1/4".

6. FIELD FILLET WELDS SHALL BE SIZED TO BE AT LEAST 1/8" LARGER THAN THE WELD SIZE SHOWN IN SCHEDULE "A", UNLESS PROPER FIT-UP IS VERIFIED BY A SPECIAL INSPECTOR PRIOR TO WELDING.

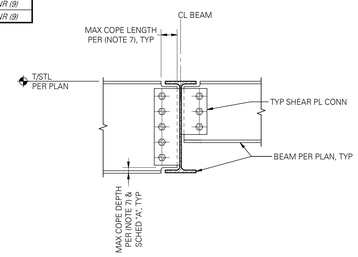
7. COPE DEPTHS (SINGLE AND DOUBLE) SHALL NOT EXCEED THE LESSER OF THOSE SHOWN IN SCHEDULE "A", NOR AS ALLOWED BY BOLT HOLE SPACING AND MINIMUM EDGE DISTANCE REQUIREMENTS. COPE LENGTHS (SINGLE AND DOUBLE) SHALL NOT EXCEED 6 1/2". (WHERE COPE LENGTH EXCEEDS 6 1/2", PROVIDE WEB STIFFENERS PER 10/S4-00).

8. UNCOPED CAPACITIES OF WT CONNECTIONS ARE VALID WITH MINIMUM NOMINAL HSS COLUMN WALL TABULATED THICKNESS. THE EFFECTIVE THROAT OF FLARE BEVEL GROOVE WELDS IS BASED ON OUTSIDE RADIUS OF HSS, AND IS TAKEN AS 5/8 TIMES THE HSS WALL THICKNESS BASED ON AWS D1.1, TABLE 2.1. WHEN 3/4" DIAMETER A325-N BOLTS ARE USED, A 3/16" HSS COLUMN WALL THICKNESS IS PERMITTED WITH A 20% REDUCTION OF THE WT CONNECTION CAPACITY.

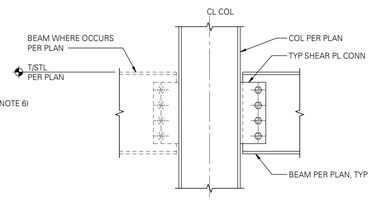
9. NR = NOT RECOMMENDED. DOUBLE COPES FOR THESE BEAMS ARE RESTRICTED BY CONNECTION GEOMETRY AND/OR LARGE REDUCTIONS IN SHEAR CAPACITY. DOUBLE COPES ARE POSSIBLE, BUT CAPACITIES MUST BE CALCULATED FOR SPECIFIC BEAM AND GIRDER GEOMETRIES AND MUST BE DETAILED SEPARATELY.



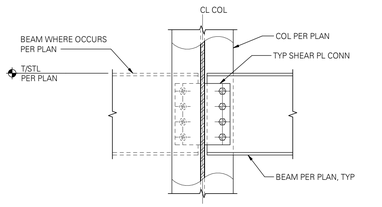
TYPICAL SHEAR PLATE CONNECTION



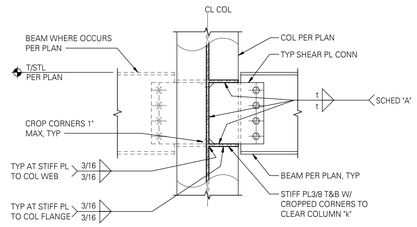
BEAM TO BEAM CONNECTION
SHEAR PLATE INFORMATION PER TYPICAL SHEAR PLATE CONNECTION.



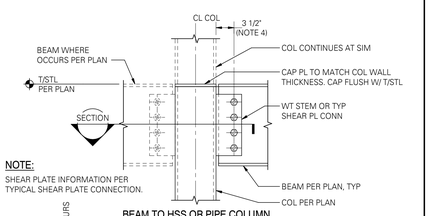
BEAM TO WIDE FLANGE COLUMN FLANGE
SHEAR PLATE INFORMATION PER TYPICAL SHEAR PLATE CONNECTION.



BEAM TO WIDE FLANGE COLUMN WEB - OPTION 1
(BEAM FITS INSIDE COLUMN)
SHEAR PLATE INFORMATION PER TYPICAL SHEAR PLATE CONNECTION.

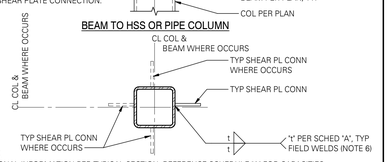


BEAM TO WIDE FLANGE COLUMN WEB - OPTION 2
SHEAR PLATE INFORMATION PER TYPICAL SHEAR PLATE CONNECTION.



NOTE:
SHEAR PLATE INFORMATION PER TYPICAL SHEAR PLATE CONNECTION.

BEAM TO HSS OR PIPE COLUMN

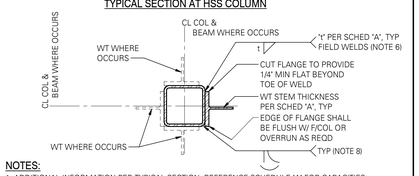


NOTES:
1. ADDITIONAL INFORMATION PER TYPICAL SECTION, REFERENCE SCHEDULE "A" FOR CAPACITIES.

2. SINGLE PLATE SHEAR TAB CONNECTIONS ARE VALID FOR ALL SQUARE AND RECTANGLE HSS COLUMNS WITH MINIMUM WALL THICKNESS NOTED IN SCHEDULE "A" EXCEPT:
- HSS9x__x1/4
- HSS10x__x1/4
- HSS12x__x1/4
- HSS12x__x5/16
- ALL HSS LARGER THAN 14x

3. FOR COLUMNS THAT DO NOT MEET THE SIZE REQUIREMENTS OF NOTE 2, USE ALTERNATE SECTION DETAIL BELOW.

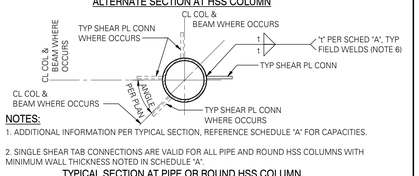
TYPICAL SECTION AT HSS COLUMN



NOTES:
1. ADDITIONAL INFORMATION PER TYPICAL SECTION, REFERENCE SCHEDULE "A" FOR CAPACITIES.

2. WT SHEAR TAB CONNECTIONS ARE VALID FOR ALL SQUARE AND RECTANGLE HSS COLUMNS. USE TYPICAL SECTION DETAIL WHERE POSSIBLE.

ALTERNATE SECTION AT HSS COLUMN



NOTES:
1. ADDITIONAL INFORMATION PER TYPICAL SECTION, REFERENCE SCHEDULE "A" FOR CAPACITIES.

2. SINGLE SHEAR TAB CONNECTIONS ARE VALID FOR ALL PIPE AND ROUND HSS COLUMNS WITH MINIMUM WALL THICKNESS NOTED IN SCHEDULE "A".

TYPICAL SECTION AT PIPE OR ROUND HSS COLUMN

17 SINGLE SHEAR PLATE (SINGLE ROW) CONNECTIONS

SCALE: 1" = 1'-0" (05201)

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REGISTERED PROFESSIONAL ENGINEER — JAMES M. T. — 36283 — Exp. 6/30/25 — STRUCTURAL — STATE OF CALIFORNIA

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ADDITIONAL DATE (OPT)	00.00.00
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CHECK	SM

STEEL DETAILS

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CALIFORNIA GREEN BUILDING STANDARDS NOTES

ENTIRE INSTALLATION SHALL COMPLY WITH THE 2022 CALIFORNIA GREEN BUILDING STANDARDS (CALGREEN) CODE INCLUDING THE FOLLOWING APPLICABLE MANDATORY MEASURES:

1. 5.504.1.3 – PERMANENT HVAC SYSTEM SHALL ONLY BE USED DURING CONSTRUCTION IF NECESSARY TO CONDITION THE BUILDING WITHIN THE REQUIRED TEMPERATURE RANGE FOR MATERIAL AND EQUIPMENT INSTALLATION. IF THE HVAC SYSTEM IS USED DURING CONSTRUCTION, CONTRACTOR SHALL USE MERV 13 MINIMUM RETURN AIR FILTERS. REPLACE ALL FILTERS IMMEDIATELY PRIOR TO OCCUPANCY.
2. 5.504.3 – CONTRACTOR SHALL COVER ALL DUCT AND OTHER RELATED AIR DISTRIBUTION COMPONENT OPENINGS WITH TAPE, PLASTIC, SHEET METAL OR OTHER METHODS ACCEPTABLE TO THE ENFORCING AGENCY DURING STORAGE AND CONSTRUCTION AND UNTIL FINAL STARTUP.
3. 5.504.5.3 – MERV 13 FILTERS ARE REQUIRED FOR HVAC SYSTEMS SERVING REGULARLY OCCUPIED AREAS AND AS INDICATED IN THESE PLANS.
4. 5.504.7 – OUTDOOR SMOKING AREAS SHALL BE MINIMUM 25'–0" FROM ALL BUILDING ENTRIES, OUTDOOR AIR INTAKES, AND OPERABLE WINDOWS.
5. 5.505.1 – INSTALLATION SHALL COMPLY WITH CBC SECTION 1203 AND CHAPTER 14 FOR INDOOR MOISTURE CONTROL.
6. 5.506.2 – DEMAND CONTROL VENTILATION REQUIRED FOR ALL DENSELY OCCUPIED SPACES PER 2013 CALIFORNIA ENERGY CODE REQUIREMENTS.
7. 5.508.1 – HVAC, REFRIGERATION, AND FIRE SUPPRESSION EQUIPMENT SHALL NOT CONTAIN CFCS OR HALONS.

CALIFORNIA TITLE 24 STANDARDS NOTES

TITLE 24 ADMINISTRATIVE REQUIREMENTS:

1. THE PERSON WITH OVERALL RESPONSIBILITY FOR CONSTRUCTION OR THE PERSON RESPONSIBLE FOR THE INSTALLATION OF REGULATED FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES SHALL POST, OR MAKE AVAILABLE WITH THE BUILDING PERMIT(S) ISSUED FOR THE BUILDING, THE REQUIRED INSTALLATION CERTIFICATE(S) FOR FEATURES, MATERIALS, COMPONENETS, OR MANUFACTURED DEVICES REGULATED BY THE APPLIANCE EFFICIENCY REGULATIONS OR PART 6. SUCH INSTALLATION CERTIFICATE(S) SHALL BE MADE AVAILABLE TO THE ENFORCEMENT AGENCY FOR ALL APPROPRIATE INSPECTIONS. THESE CERTIFICATES SHALL:
   - 1.1. IDENTIFY FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES REQUIRED TO VERIFY COMPLIANCE WITH THE APPLIANCE EFFICIENCY REGULATIONS AND PART 6.
   - 1.2. INCLUDE A STATEMENT INDICATING THAT THE FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICE CONFORM TO THE APPLIANCE EFFICIENCY REGULATIONS AND PART 6 AND THE REQUIREMENTS FOR SUCH FEATURES, MATERIALS, COMPONENTS, OR MANUFACTURED DEVICES GIVEN IN THE PLANS AND SPECIFICATIONS APPROVED BY THE LOCAL ENFORCEMENT AGENCY.
   - 1.3. STATE THE NUMBER OF THE BUILDING PERMIT UNDER WHICH THE CONSTRUCTION OR INSTALLATION WAS PERFORMED.
2. THE BUILDER SHALL PROVIDE THE BUILDING OWNER OR THE PERSON(S) RESPONSIBLE FOR BUILDING MAINTENANCE (IN CASE OF MULTI–TENANT OR CENTRALLY–OPERATED BUILDINGS) AT OCCUPANCY THE FOLLOWING:
   - 2.1. OPERATING INFORMATION: THE APPROPRIATE CERTIFICATE(S) OF COMPLIANCE AND A LIST OF THE FEATURES, MATERIALS, COMPONENTS, AND MECHANICAL DEVICES INSTALLED IN THE BUILDING AND INSTRUCTIONS ON HOW TO OPERATE THEM EFFICIENTLY.
   - 2.2. MAINTENANCE INFORMATION: REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY STATED AND INCORPORATED ON A READILY ACCESSIBLE LABEL. THE LABEL MAY BE LIMITED TO IDENTIFYING THE OPERATION AND MAINTENANCE MANUAL.
   - 2.3. VENTILATION INFORMATION: A DESCRIPTION OF THE QUANTITIES OF OUTDOOR AND RECIRCULATED AIR THAT THE VENTILATION SYSTEMS ARE DESIGNED TO PROVIDE TO EACH AREA.

TITLE 24 MANDATORY MEASURES:

1. MANUFACTURED FENESTRATION AND EXTERIOR DOORS SHALL MEET ALL LISTED REQUIREMENTS IN SEC 10–111–(A) UNDER SECTION 110.6(A) OF PART 6. TEMPORARY LABELS FOR MANUFACTURED FENESTRATION SHALL HAVE A CLEARLY VISIBLE TEMPORARY LABEL AND SHALL COMPLY WITH LABELLING REQUIREMENTS OF NFRC 700. NO OTHER VALUES FOR U–FACTOR, SHGC, VT, AND AIR LEAKAGE ARE ALLOWED ON THE TEMPORARY LABEL ATTACHED TO THE MANUFACTURED FENESTRATION PRODUCT OR EXTERIOR DOOR.
2. RATED FENESTRATION SHALL HAVE A PERMANENT LABEL CONSISTENT WITH THEIR RATING AND CERTIFICATION THAT IS EITHER A STAND–ALONE LABEL, AN EXTENSION OR TAB OF AN EXISTING PERMANENT CERTIFICATION LABEL BEING USED BY THE MANUFACTURER / RESPONSIBLE PARTY, OR A SERIES OF MARKS OR ETCHINGS ON THE PRODUCT.
3. JOINTS, PENETRATIONS AND OTHER OPENINGS IN THE BUILDING ENVELOPE THAT ARE POTENTIAL SOURCES OF AIR LEAKAGE SHALL BE CAULKED, GASKETED, WEATHER STRIPPED, OR OTHERWISE SEALED TO LIMIT INFILTRATION AND EXFILTRATION.
4. ALL INSULATING MATERIAL SHALL BE INSTALLED IN COMPLIANCE WITH THE FLAME–SPREAD RATING AND SMOKE DENSITY REQUIREMENTS OF THE CBC.
5. NON–CENTRALIZED ENERGY MANAGEMENT SYSTEMS SHALL HAVE SETBACK THERMOSTATS CAPABLE TO PROGRAM TEMPERATURE SETPOINTS FOR AT LEAST FOUR PERIODS WITHIN A 24–HR PERIOD.
6. THE LESSER OF THE MINIMUM RATE OF OUTDOOR AIR REQUIRED BY SECTION 120.1(C) OR THREE COMPLETE AIR CHANGES SHALL BE SUPPLIED TO THE ENTIRE BUILDING DURING THE ONE–HOUR PERIOD IMMEDIATELY BEFORE THE BUILDING IS NORMALLY OCCUPIED.
7. ALL MECHANICAL VENTILATION AND SPACE–CONDITIONING SYSTEMS SHALL BE DESIGNED WITH DUCTWORK, DAMPERS, AND CONTROLS WHICH ALLOWS OUTSIDE AIR RATES TO BE OPERATED AT THE LARGER OF (1) THE MINIMUM LEVELS SPECIFIED IN SECTION 120.1(C)3 OR (2) THE RATE REQUIRED FOR MAKEUP OF EXHAUST SYSTEMS THAT ARE REQUIRED FOR AN EXEMPT OR COVERED PROCESS, FOR CONTROL OF ODORS, OR FOR THE REMOVAL OF CONTAMINANTS WITHIN THE SPACE. MEASURED OUTSIDE AIR RATES OF CONSTANT AND VARIABLE VOLUME MECHANICAL VENTILATION SYSTEMS SHALL BE WITHIN 10% OF OUTSIDE AIR RATE SHOWN ON TABLE 120.1(A).
8. THE THERMOSTATIC CONTROLS FOR HVAC SYSTEMS SHALL BE CAPABLE OF BEING SET LOCALLY OR REMOTELY TO CONTROL COMFORT HEATING DOWN TO 55°F OR LOWER AND COOLING UP TO 85°F OR HIGHER. THE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A DEAD BAND RANGE OF AT LEAST 5°F WITHIN WHICH HEATING AND COOLING ENERGY TO THE ZONEIS SHUTOFF OR REDUCED TO A MINIMUM.
9. OUTDOOR AIR SUPPLY AND EXHAUST EQUIPMENT SHALL BE INSTALLED WITH DAMPERS THAT AUTOMATICALLY CLOSE UPON FAN SHUTDOWN.
10. AIR DISTRIBUTION SYSTEM DUCTS AND PLENUMS, INCLUDING, BUT NOT LIMITED TO, BUILDING CAVITIES, MECHANICAL CLOSETS, AIR–HANDLER BOXES AND SUPPORT PLATFORMS USED AS DUCTS OR PLENUMS, SHALL BE INSTALLED, SEALED AND INSULATED TO MEET THE REQUIREMENTS OF CHAPTER 6 CMC CODE AND ANSI/SMACNA–006–2006 HVAC DUCT CONSTRUCTION STANDARDS – METAL AND FLEXIBLE. SUPPLY AIR DUCTS CONVEYING HEATED OR COOLED AIR SHALL BE INSULATED TO A MINIMUM INSTALLED LEVEL OF R–4.2 (R–8 IN UNCONDITIONED SPACE), UNLESS DUCTS ARE IN CONDITIONED SPACE.
11. EACH SPACE–CONDITIONING SYSTEM SHALL BE INSTALLED WITH CONTROLS (1) CAPABLE OF AUTOMATICALLY SHUTTING OFF THE SYSTEM DURING PERIODS OF NON–USE AND SHALL HAVE (A) 4–HR TIMER OR (B) OCCUPANCY SENSORS OR (C) AUTO TIME SWITCH CONTROLS AND ACCESSIBLE MANUAL OVERRIDE FOR UP TO 4–HRS. (2) AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN SETBACK THERMOSTAT SETPOINTS FOR MECHANICAL HEATING AND COOLING. (3) MULTIPURPOSE, CLASSROOMS, CONFERENCE, CONVENTION, AUDITORIUM, AND MEETING CENTER ROOMS OF CERTAIN SIZE WHICH DO NOT HAVE PROCESSES OR OPERATIONS THAT GENERATE DUSTS, FUMES, VAPORS, OR GASSES SHALL BE EQUIPPED WITH OCCUPANT SENSOR(S) TO ACCOMPLISH THE FOLLOWING DURING UNOCCUPIED PERIODS (A) AUTOMATICALLY SETUP THE OPERATING COOLING TEMPERATURE SETPOINT BY 2°F OR MORE AND SETBACK THE OPERATING HEATING TEMPERATURE SETPOINT OR MORE AND (B) AUTOMATICALLY RESET THE MINIMUM REQUIRED VENTILATION RATE WITH AN OCCUPANT SENSOR VENTILATION CONTROL DEVICE ACCORDING TO SECTION 120.1(C)5. (4) HOTEL AND MOTEL GUEST ROOMS SHALL HAVE CAPTIVE CARD KEY CONTROLS, OCCUPANCY SENSING CONTROLS, OR AUTOMATIC CONTROLS SUCH THAT, NO LONGER THAN 30 MINUTES AFTER THE GUEST ROOM HAS BEEN VACATED, SETPOINTS ARE SETUP AT LEAST +5°F IN COOLING MODE AND SETDOWN AT LEAST –5°F IN HEATING MODE.
12. DUCT SYSTEMS USED WITH BLOWER TYPE EQUIPMENT WHICH ARE PORTIONS OF A HEATING, COOLING, ABSORPTION, EVAPORATIVE COOLING OR OUTDOOR AIR VENTILATION SYSTEM SHALL BE SIZED IN ACCORDANCE WITH CHAPTER 17 OF THE CALIFORNIA MECHANICAL CODE.

LEGEND

SYMBOL	ABBR.	DESCRIPTION
	–	SUPPLY AIR RISER
	–	RETURN AIR RISER
	–	EXHAUST AIR RISER
	SAG	SUPPLY AIR GRILLE
	RAG	RETURN AIR GRILLE
	EAG	EXHAUST AIR GRILLE
	SWR	SIDEWALL REGISTER
	(L)	LINED DUCTWORK
	–	FLEXIBLE CONNECTION
	FC	FLEXIBLE CONNECTION
	–	DEMO DUCT (SEE PLAN)
	MVD	MANUAL VOLUME DAMPER
	BDD	BACKDRAFT DAMPER
SFD	SFD	SMOKE / FIRE DAMPER
FD	FD	FIRE DAMPER
	DL	DOOR LOUVER
U.C.	UC	UNDERCUT DOOR 3/4"
RS	RS	REFRIGERANT SUCTION LINE
RL	RL	REFRIGERANT LIQUID LINE
CD	CD	CONDENSATE DRAIN
	S.D.	SMOKE DETECTOR
	P.O.C.	POINT OF CONNECTION
T	T–STAT	THERMOSTAT
H	H	HUMIDISTAT
TS	TS	TEMPERATURE SENSOR
OS	OS	OVERRIDE SWITCH
PD	PD	PRESSURE DIFFERENTIAL SWITCH
S	S	SWITCH
	O.C.	ON CENTER
	I.D.	INSIDE DIAMETER
	O.D.	OUTSIDE DIAMETER
	W/	WITH
	S/M	SHEET METAL
	S/S	STAINLESS STEEL
	G.C.	GENERAL CONTRACTOR
	VTR	VENT THRU ROOF
	OBD	OPPOSED BLADE DAMPER
	FSC	FAN SPEED CONTROL
E	E	ITEMS FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR AS SPECIFIED ON THE ELECTRICAL CONTRACT DOCUMENTS
M	M	ITEMS FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR AS SPECIFIED ON THE MECHANICAL CONTRACT DOCUMENTS
EM	EM	ITEMS FURNISHED BY ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR.
ME	ME	ITEMS FURNISHED BY MECHANICAL CONTRACTOR AND INSTALLED BY ELECTRICAL CONTRACTOR.
	CBD	COUNTER–BALANCE DAMPER
	D.S.	FAN SPEED CONTROL
DS	FSC	DOOR SWITCH

GENERAL NOTES

1. ENTIRE INSTALLATION SHALL CONFORM TO THE REQUIREMENTS OF THE 2022 CALIFORNIA MECHANICAL CODE, 2022 CALIFORNIA BUILDING CODE, AND ALL OTHER APPLICABLE CODES AND REGULATIONS, INCLUDING 2022 CALIFORNIA ENERGY CONSERVATION STANDARDS DIVISION T–24.
2. COORDINATE ENTIRE INSTALLATION OF THE HVAC SYSTEM WITH THE WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS, AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ITEMS TO BE PROVIDED BY OTHER TRADES WHERE MENTIONED IN THE CONTRACT DOCUMENTS PRIOR TO BID – NO EXCEPTIONS.
3. COORDINATE THE LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES WITH THE ARCHITECTURAL REFLECTIVE CEILING PLAN, ELECTRICAL LIGHTING LAYOUT AND ARCHITECTURAL ROOM ELEVATIONS. THE ARCHITECT AND ENGINEER SHALL BE IMMEDIATELY NOTIFIED OF ANY CONFLICTS PRIOR TO FABRICATION AND INSTALLATION.
4. ALL EQUIPMENT, DUCTS, PIPING, AND OTHER DEVICES AND MATERIALS INSTALLED OUTSIDE OF THE BUILDING OR OTHERWISE EXPOSED TO THE WEATHER SHALL BE COMPLETELY WEATHER–PROOFED AND PAINTED TO MATCH, COORDINATE WITH ARCHITECT PRIOR TO PAINTING.
5. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH AND BE CONSIDERED TO BE PART OF A SEPARATE AND COMPLETE MECHANICAL SPECIFICATION.
6. ALL DIMENSIONS SHOWN ON THESE PLANS ARE APPROXIMATE AND MUST BE CONFIRMED ON SITE.
7. PRIOR TO OCCUPANCY, THE ENTIRE H.V.A.C. SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH (AABC) ASSOCIATED AIR BALANCE COUNCIL STANDARDS BY AN INDEPENDANT AIR BALANCE CONTRACTOR. CERTIFICATION SHALL BE PROVIDED BY THE CONTRACTOR FOR AIR AND HYDRONIC AS APPLICABLE. SYSTEMS SHALL BE BALANCED AS INDICATED ON PLANS INCLUDING FRESH AIR VENTILATION. WHERE THERE IS A CONFLICT WITH THE MECHANICAL PLANS, THE AIR BALANCE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO BALANCING OF SYSTEM. IF NOT THE AIR BALANCE CONTRACTOR SHALL BEAR ALL COSTS INCURRED FOR WORK THAT MUST BE RE–BALANCED DUE TO CONFLICTS ON CONTRACT DOCUMENTS. CONTRACTOR SHALL PROVIDE THREE COPIES OF THE AIR BALANCE REPORT TO THE ENGINEER FOR APPROVAL.
8. FOR INACCESSIBLE AREAS THE CONTRACTOR SHALL PROVIDE ACCESS PANELS FOR ALL DAMPERS, EQUIPMENT, SMOKE DETECTORS, AND CONTROL DEVICES. THESE PANELS SHALL MATCH THE RATING OF THE WALL AND/OR CEILING THAT THEY ARE LOCATED IN. MINIMUM ACCESS PANEL SIZES SHALL BE AS FOLLOWS:

   1) HAND ACCESS: 12"x12"

   2) BODY ACCESS: 30"x30" MIN. WHERE A LARGER ACCESS SIZE IS REQUIRED DUE TO INSTALLATION CONSTRAINTS, THE CONTRACTOR SHALL DO SO AT NO ADDITIONAL COST AND SHALL NOTIFY THE ARCHITECT AND ENGINEER OF DEVIATIONS PRIOR TO INSTALLATION.
9. COORDINATE THE LOCATION OF ALL ROOF OPENINGS AND THE LOCATION OF ALL ROOF MOUNTED EQUIPMENT WITH THE STRUCTURAL AND ARCHITECTURAL PLANS PRIOR TO ANY INSTALLATION.
10. PLATFORMS, CURBS, AND FLASHINGS FOR MECHANICAL EQUIPMENT SHALL BE AS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL PLANS UNLESS NOTED OTHERWISE. WHERE THERE IS A CONFLICT WITH THE MECHANICAL PLANS, THE CONTRACTOR SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO FABRICATION AND INSTALLTION.
11. ALL EQUIPMENT, ACCESSORIES, AND RELATED PIPING SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS. PROVIDE ALL FITTINGS, TRANSITIONS, DAMPERS, VALVES, AND OTHER DEVICES REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
12. MAINTENANCE LABEL SHALL BE AFFIXED TO ALL MECHANICAL EQUIPMENT AND A MAINTENANCE MANUAL SHALL BE PROVIDED FOR THE OWNER'S USE.
13. PROVIDE MERV 13 FILTERS FOR ALL AIR CONDITIONING UNITS. SEE EQUIPMENT SCHEDULE AND SPECIFICATIONS FOR TYPE. SIZES SHALL BE AS RECOMMENDED BY THE MANUFACTURER, UNLESS OTHERWISE SPECIFIED.
14. AIR FILTERS SHALL BE STATE FIRE MARSHALL APPROVED AND LISTED. PRE–FORMED FILTERS HAVING COMBUSTIBLE FRAMING SHALL BE TESTED AS A COMPLETE ASSEMBLY. AIR FILTERS SHALL BE ACCESSIBLE FOR CLEANING OR REPLACEMENT.
15. ALL EQUIPMENT WITH MOVING PARTS SHALL BE PROVIDED WITH FLEXIBLE DUCT AND PIPE CONNECTIONS.
16. ALL EQUIPMENT SHALL BE LABELED AS TO THE SPACE IT SERVES. SEE PLANS AND SPECIFICATIONS FOR IDENTIFICATION STANDARDS. (CMC 303.6).
17. ALL HVAC EQUIPMENT SHALL BE CERTIFIED BY THE CALIFORNIA ENERGY COMMISSION TO COMPLY WITH LATEST EFFICIENCY STANDARDS.
18. AC UNITS PROVIDED WITH ECONOMY CYCLE DAMPERS SHALL HAVE DAMPERS SET UP TO CLOSE AUTOMATICALLY ON FAN SHUTDOWN.
19. PROVIDE MANUAL VOLUME DAMPERS AND BACKDRAFT DAMPERS FOR FRESH AIR INTAKES ON ALL AIR HANDLING EQUIPMENT AND EXHAUST FANS SERVING CONDITIONED SPACES. EXCEPTION: EQUIPMENT WITH FACTORY ECONOMIZERS.
20. ALL FRESH AIR INTAKES SHALL MEET CODE REQUIRED CLEARANCES FROM EXHAUST, FLUE, FUEL BURNING APPLIANCE AND PLUMBING VENT OUTLETS. FOR GAS/ELECTRIC AIR CONDITIONING UNITS WHERE THE CODE REQUIRED CLEARANCES ARE NOT MET, A FACTORY FLUE GAS DEFLECTOR AND EXTENSION SHALL BE USED TO MINIMIZE THESE CLEARANCES. CONTRACTOR SHALL DETERMINE LOCATIONS WHERE REQUIRED PRIOR TO BID. THIS SHALL BE PROVIDED AT NO ADDITIONAL COST.
21. ALL AIR HANDLING EQUIPMENT SERVING CONDITIONED SPACES SHALL PROVIDE CONTINUOUS FRESH AIR TO SPACES IN OCCUPIED MODE.
22. CONTRACTOR SHALL VERIFY ALL CLEARANCES AND AVAILIABLE SPACE FOR DUCTWORK PRIOR TO ORDERING AND/OR FABRICATING MATERIAL.
23. CONTRACTOR TO SUBMIT ALL EQUIPMENT, DUCTWORK, AIR DISTRIBUTION DEVICES, AND OTHER ACCESSORIES TO THE ENGINEER FOR APPROVAL PRIOR TO ANY ORDERING OF SUCH ITEMS.
24. CONTRACTOR SHALL PROVIDE SHOP DRAWINGS WITHIN 45 DAYS OF AWARD OF CONTRACT. SEE 230000 SPECIFICATIONS FOR REQUIREMENTS. ALL CONFLICTS BETWEEN VARIOUS TRADES' SHOP DRAWINGS SHALL BE REPORTED TO THE CITY, ARCHITECT, AND ENGINEER OF RECORD. FAILURE TO REPORT CONFLICTS SHALL RESULT IN REJECTION OF RELATED CLAIMS FOR REWORK, EXTRA WORK, AND TIME FOR EXTENSIONS.
25. CONTRACTOR SHALL BE RESPONSIBLE FOR COMMISSIONING OF EQUIPMENT AS STIPULATED ON MECH–1–C FORM ON PLANS UNLESS NOTED OTHERWISE.
26. CONTROL SCHEMATICS ARE FOR SEQUENCE ONLY. REFER TO ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ALL ELECTRICAL DEVICES REQUIRED.
27. ALL LINE VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT. ALL LINE VOLTAGE CONDUIT AND WIRING, INCLUDING FINAL CONNECTIONS, SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR AS INDICATED ON THE ELECTRICAL DRAWINGS OR SPECIFIED IN THE ELECTRICAL SECTION OF THE SPECIFICATIONS. ALL ELECTRICAL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES AND REGULATIONS OF ALL GOVERNING BODIES HAVING JURISDICTION THEREOF.
28. ALL LOW VOLTAGE CONDUIT AND WIRING AS APPLICABLE, INCLUDING FINAL CONNECTIONS, SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AS INDICATED ON THE MECHANICAL DRAWINGS OR SPECIFIED IN THE MECHANICAL SECTION OF THE SPECIFICATIONS.

   A) ALL LOW VOLTAGE WIRING SHALL BE INSTALLED IN CONDUIT.

   B) WHERE THE CONTROLS CONTRACTOR IS RETAINED BY THE OWNER, THEY SHALL BE RESPONSIBLE FOR THE FOLLOWING:

   1) FURNISH AND INSTALL ALL DEVICES, WIRING, AND TERMINATIONS REQUIRED FOR A COMPLETE AND FUNCTIONAL INSTALLATION.

   2) COORDINATE ALL WORK AND REQUIREMENTS WITH OTHER TRADES INCLUDING GENERAL, MECHANICAL, AND ELECTRICAL CONTRACTORS PRIOR TO BID.

   3) CONTRACTOR SHALL FOLLOW ALL SUBMITTAL REQUIREMENTS PER DRAWINGS AND SPECIFICATIONS.
29. CONTRACTOR SHALL BE RESPONSIBLE FOR ORDERING AIR CONDITIONING EQUIPMENT WITH THRU–THE–BASE POWER, CONTROL, AND GAS CONNECTIONS. VERIFY ALL CONNECTION LOCATIONS WITH UNIT MANUFACTURER AND COORDINATE WITH OTHER TRADES AS NECESSARY.
30. ELECTRICAL CONTRACTOR SHALL PROVIDE REQUIRED RELAY ACCESSORIES FOR CONNECTION OF 120 VOLT 1 PHASE VENTILATION EQUIPMENT TO 277 VOLT 1 PHASE LIGHTING AS APPLICABLE. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR SUCH COORDINATION PRIOR TO BID.
31. WHERE HVAC CONTROL WIRING IS REQUIRED BETWEEN BUILDINGS. PROVIDE UNDERGROUND CONDUIT WITH PULL STRINGS (1) FURNISHED AND INSTALLED BY ELECTRICAL FOR THE ENERGY MANAGEMENT SYSTEM WIRING TERMINATIONS ONLY. CONTRACTOR SHALL FURNISH AND INSTALL CONDUIT AND WIRING TERMINATIONS FOR BETWEEN BUILDINGS.
32. ALL THERMOSTATS SHALL HAVE LOCKABLE COVERS (WHERE INDICATED ON PLANS) AND SHALL BE OF THE ELECTRONIC, PROGRAMMABLE, AUTOMATIC CHANGEOVER TYPE TO SEQUENCE HEATING OR COOLING. SET POINT RANGE SHALL BE 10 DEGREES F. BETWEEN FULL HEATING AND COOLING. THEY SHALL HAVE CAPACITY OF TERMINATING ALL HEATING AT A TEMPERATURE NO MORE THAN 70 DEGREES F., AND COOLING AT A TEMPERATURE NOT LESS THAN 78 DEGREES F. ADJUSTABLE TEMPERATURE DIFFERENTIAL SHALL BE 1– 1/2 DEGREES F. CONTROL LIMITS SHALL BE FROM 55 DEGREES F. TO 85 DEGREES F. MOUNT AT 48 INCHES ABOVE FLOOR OR AS REQUIRED BY LOCAL AUTHORITIES OR ACCESSIBILITY CODES.

   NOTES:
   1) THERMOSTATS THAT ARE PART OF AN ENERGY MANAGEMENT SYSTEM SHALL FOLLOW CONTROL SPECIFICATIONS AND DRAWING REQUIREMENTS.

   2) SHOULD THE LOCATION OF THE THERMOSTAT NOT MEET THE ADA HEIGHT REQUIREMENTS DUE TO OBSTRUCTIONS, THEN AN ALTERNATE LOCATION SHALL BE PROPOSED OR REQUESTED BY THE CONTRACTOR THAT SHALL BE APPROVED BY THE ENGINEER AND ARCHITECT.
33. LINE VOLTAGE THERMOSTATS SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
34. CONTROLS CONTRACTOR AND AIR BALANCE CONTRACTOR SHALL COORDINATE WORK AND PERFORM NECESSARY TASKS AS REQUIRED TO OBTAIN AIR AND WATER FLOW QUANTITIES FOR SYSTEMS SHOWN HEREIN.
35. CONTROLS SHALL BE PROVIDED TO PROVIDE THE MINIMUM RATE OF OUTDOOR AIR REQUIRED BY THE STATE ENERGY REGULATIONS.
36. ALL DUCTWORK SHALL BE SHEET METAL CONSTRUCTED OR SPIRAL, ERECTED, AND TESTED IN ACCORDANCE WITH THE MOST RESTRICTIVE OF LOCAL REGULATIONS, PROCEDURES DETAILED IN THE ASHRAE HANDBOOK OF FUNDAMENTALS, CHAPTER 6 OF THE MECHANICAL CODE, OR THE APPLICABLE STANDARDS ADOPTED BY THE SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION.
37. ALL FLEXIBLE DUCTWORK SHALL BE MAX FIVE FEET AND MIN 3 FEET IN LENGTH TO RESPECTIVE DIFFUSERS, GRILLES, AND REGISTERS, OR OTHER AIR DEVICES.
38. PROVIDE SEISMIC RESTRAINTS TO ALL DUCTWORK, PIPE, AND EQUIPMENT SUPPORTS IN ACCORDANCE WITH THE LATEST SMACNA GUIDELINES FOR SEISMIC RESTRAINT OF MECHANICAL SYSTEMS. SUSPENDED EQUIPMENT SHALL BE PROVIDED WITH SEISMIC ANCHORAGE AND ISOLATION SUPPORTS. SEE SEISMIC NOTES THIS SHEET FOR ADDITIONAL REQUIREMENTS.
39. ALL RECTANGULAR DUCT TURNS IN SUPPLY, RETURN, AND EXHAUST DUCTS SHALL HAVE TURNING VANES UNLESS OTHERWISE NOTED.
40. DUCTWORK HANDLING CONDITIONED AIR SHALL BE INSULATED OR LINED AS INDICATED ON DRAWINGS. SUPPLY AND RETURN DUCT INSULATION SHALL BE MIN. 1.5" THICK, 3/4 LB./CUBIC FT. DENSITY AND HAVE A MIN. VALUE OF R–8 WHERE LOCATED IN ONE OR MORE OF THE FOLLOWING SPACES:

   A) OUTDOORS, OR

   B) IN A SPACE BETWEEN THE ROOF AND AN INSULATED CEILING, OR

   C) IN A SPACE DIRECTLY UNDER A ROOF WITH FIXED VENTS OR OPENINGS TO THE OUTSIDE OR UNCONDITIONED SPACES, OR

   D) IN AN UNCONDITIONED CRAWLSPACE; OR

   E) IN OTHER UNCONDITIONED SPACES

   PER 2022 CEC, OTHERWISE PROVIDE R–4.2 WHEN LOCATED IN CONDITIONED ATTIC SPACES ABOVE CEILINGS. ALL DUCTWORK EXPOSED ON ROOF SHALL BE INTERNALLY LINED WITH 1.5" THICK, 1.5LB./CUBIC FT. DENSITY DUCT LINER UNLESS OTHERWISE INDICATED OR SPECIFIED. ALL DUCT SIZES ARE SHEET METAL SIZES. ALL DUCT JOINTS SHALL BE SEALED PER CHAPTER 6 MECHANICAL CODE REQUIREMENTS. PROVIDE PIPING AND DUCT INSULATION IN ACCORDANCE WITH THE LATEST STANDARDS OF THE CALIFORNIA ENERGY COMMISSION.
   MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL BE NONCOMBUSTIBLE OR SHALL HAVE A FLAME SPREAD OF NOT MORE THAN 25 AND A SMOKE DEVELOPED INDEX NOT EXCEEDING 50.

   MANUAL VOLUME DAMPERS SHALL BE PROVIDED IN ALL DUCT BRANCHES TO INDIVIDUAL DIFFUSERS, GRILLES, AND REGISTERS, AS WELL AS FRESH AIR INTAKE DUCTS. DAMPERS SHALL BE LOCATED AT THE BRANCH DUCT LOCATIONS. THE MECHANICAL CONTRACTOR SHALL COORDINATE LOCATIONS OF DAMPERS WITH THE AIR BALANCE CONTRACTOR PRIOR TO BID, SO THEY ARE ACCESSIBLE PRIOR TO INSTALLATION. IN LOCATIONS WHERE THESE DAMPERS ARE INACCESSIBLE, CABLE OPERATED ADJUSTMENT CONTROLS SHALL BE PROVIDED AT NO ADDITIONAL COST. SEE DETAIL 1/M5.1. OPPOSED BLADE DAMPERS SHALL NOT BE PERMITTED UNLESS NOTED OTHERWISE.
43. ALL VOLUME DAMPERS SHALL BE INSTALLED MIN THREE DUCT DIAMETERS UPSTREAM OF REGISTERS.

   AUTOMATIC FIRE DAMPER REQUIREMENTS ARE AS FOLLOWS:

   A) PROVIDE AUTOMATIC FIRE DAMPERS AT ALL PENETRATIONS OF FIRE–RATED CEILINGS AND WALLS THROUGHOUT. CONTRACTOR SHALL COORDINATE FIRE–RATED AREAS WITH THE ARCHITECTURAL DRAWINGS AND OTHER TRADES PRIOR TO INSTALL AND SHALL NOTIFY PERTINENT PARTIES PRIOR TO ANY WORK PERFORMED IN THESE AREAS. IN ADDITION, CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE PROPER ACCESS FOR DAMPERS INSTALLED. THE DAMPER FIRE RATING SHALL BE COMPATIBLE WITH THE CEILING/WALL RATING.

   B) LOCATION OF FIRE–RATED CEILINGS AND WALLS ARE AS INDICATED ON THE ARCHITECTURAL DRAWINGS.

   C) FIRE AND/OR SMOKE DAMPER(S) SHALL BE PROVIDED AS REQUIRED BY 2022 CBC AND CFC.

   D) CONTRACTOR SHALL FURNISH FLUSH MOUNTED FIRE AND/OR SMOKE DAMPERS, SO THAT DAMPER DO NOT EXTEND PASS WALLS, FOR AREAS WITHOUT CEILINGS FOR QUALITY WORKMENSHIP.
44. ALL DUCTWORK PASSING THROUGH FIRE RATED CORRIDORS AND LOBBIES SHALL BE MIN. 26 GAGE SHEET METAL CONSTRUCTION. FLEXIBLE DUCTWORK SHALL NOT BE ALLOWED.
45. ALL DUCTWORK, PIPING, CONDUIT, & ETC. PENETRATING FIRE RATED CONSTRUCTION SHALL HAVE APPROVED FIRE STOPPING. COORDINATE WITH OTHER TRADES PRIOR TO INSTALLATION.
46. MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROPER OPERATION OF ALL MECHANICAL EQUIPMENT INCLUDING NECESSARY DEVICES FOR INTERLOCKING OF SUCH EQUIPMENT.
47. CONTRACTOR SHALL REFER TO MECHANICAL AND ARCHITECTURAL PLANS FOR REGISTER, DIFFUSER, AND GRILLE LOCATIONS PRIOR TO INSTALLATION.
48. CONTACT THE ENGINEER IMMEDIATELY IF THERE ARE CONFLICTS PRIOR TO INSTALLATION. CONTRACTOR SHALL COORDINATE ALL LOCATIONS OF DUCT PENETRATIONS THROUGH SHEAR WALLS. NO DUCT PENETRATE SHEAR WALLS UNLESS SPECIFICALLY SHOWN ON STRUCTURAL PLANS.
49. CONTRACTOR SHALL REFER TO STRUCTURAL, MECHANICAL, AND ARCHITECTURAL PLANS FOR EXTERIOR LOU

AIR DISTRIBUTION SCHEDULE

SYM.	MANUF & MODEL	NECK SIZE	FACE SIZE	CFM RANGE	MAX. NECK VELOCITY	MAX. N.C.	T. P. DROP	TYPE	DAMPER	REMARKS
–/SD–1	PRICE PDMC	6"Ø 8"Ø 10"Ø 12"Ø 14"Ø 16"Ø 18"Ø	24"x24"	0 - 80 85 - 175 180 - 275 280 - 390 395 - 480 485 - 600 605 - 780	500	25	0.075	MODULAR PERFOR.	MVD	FRAME TYPE 3 FOR T-BAR
–/RG–1	PRICE PDDR	6"Ø 8"Ø 10"Ø 12"Ø 14"Ø 16"Ø 18"Ø	24"x24"	0 - 80 85 - 175 180 - 275 280 - 390 395 - 480 485 - 600 605 - 780	500	25	0.016	PERFOR.	MVD	FRAME TYPE 3 FOR T-BAR
–/SD–2	PRICE SMCD	6"x6" 8"x8" 10"x10" 12"x12" 14"x14" 16"x16" 18"x18" 20"x20"	12"x12" 14"x14" 16"x16" 18"x18" 20"x20" 22"x22" 24"x24" 26"x26"	0 - 125 130 - 220 225 - 350 355 - 500 505 - 680 685 - 880 885 - 1125 1130 - 1400	500	25	.057	MODULAR CORE	MVD	BORDER TYPE 1 FOR GYP. BOARD CEILING PROVIDE SQUARE TO ROUND ADAPTER FOR ALL
–/RG–2	PRICE 530L	6"x6" 8"x8" 10"x10" 12"x12" 14"x14" 16"x16" 18"x18" 22"x20"	8"x8" 10"x10" 12"x12" 14"x14" 16"x16" 18"x18" 20"x20" 24"x22"	0 - 90 95 - 195 200 - 300 305 - 450 455 - 590 595 - 800 805 - 1040 1045 - 1400	500	25	.067	LOUVERED ADJUSTABLE	MVD	BORDER TYPE N FOR GYP. BOARD CEILING
–/RG–3	PRICE 530	68"x14"	70"x16"	1500 - 3000	500	25	0.016	LOUVERED	MVD	FRAME TYPE 3 FOR T-BAR
–/EG–1	PRICE PDDR	6"Ø 8"Ø 10"Ø 12"Ø 14"Ø 16"Ø 18"Ø	24"x24"	0 - 80 85 - 175 180 - 275 280 - 390 395 - 480 485 - 600 605 - 780	500	25	0.016	PERFOR.	MVD	FRAME TYPE 3 FOR T-BAR
–/EG–2	PRICE 530L	6"x6" 8"x8" 10"x10" 12"x12" 14"x14" 16"x16" 18"x18" 22"x20"	8"x8" 10"x10" 12"x12" 14"x14" 16"x16" 18"x18" 20"x20" 24"x22"	0 - 90 95 - 195 200 - 300 305 - 450 455 - 590 595 - 800 805 - 1040 1045 - 1400	500	25	.067	LOUVERED ADJUSTABLE	MVD	BORDER TYPE N FOR SURFACE MOUNT
–/SR–1	PRICE SDS150 4-SLOT	48"x10.5"	48"x10.5"	650	500	30	0.14	LINEAR SLOT	MVD	BORDER TYPE 2 FOR SURFACE MOUNT COLOR TO MATCH ADJACENT SURFACES WITH SDB PLENUM
–/SR–2	PRICE SDS50 3-SLOT	6"Ø	36"x4"	185	500	25	0.016	LINEAR SLOT	MVD	FRAME TYPE 3 FOR T-BAR COLOR TO MATCH ADJACENT SURFACES
–/SR–3	PRICE LBP	68'-0"x6"	68'-0"x6"	1200	500	25	0.016	LINEAR BAR	MVD	SIDEWALL

LEGEND

– CFM
– AIR DISTRIBUTION DEVICE

SD	SUPPLY DIFFUSER
SR	SUPPLY REGISTER
RG	RETURN GRILLE
EG	EXHAUST GRILLE
TG	TRANSFER GRILLE

NOTES:
1. NOT ALL DIFFUSER/GRILLE TYPES OR SIZES MAY BE USED ON THIS PROJECT.

PACKAGED HEAT PUMP UNIT SCHEDULE

SYM	MFR & MODEL #	NOMINAL TONS	CFM	OSA CFM MIN.	ESP (IN. WG)	FAN HP	REFRIG.	HEATING CAPACITY (BTU/h)	COOLING CAPACITY (BTU/h)	SEER	EER	FILTER EFFICIENCY	ELECTRICAL V	PH	MCA	MOCP	UNIT WEIGHT	CURB WEIGHT	ANCHORAGE DETAIL	REMARKS
HP 1A	TRANE WHK036A3	3	1200	190	0.6	0.75	454A	32,310	36,660	16.2	12.8	MERV 13	208	3	23	30	950	155	4 / M3.1	1, 2, 3, 4, 7
HP 1B	TRANE WHK036A3	3	1200	190	0.6	0.75	454A	32,310	36,660	16.2	12.8	MERV 13	208	3	23	30	950	155	4 / M3.1	1, 2, 3, 4, 7
HP 2A	TRANE WHK072A3	6	1950	580	0.6	2.75	454A	68,590	74,360	16.3	12.8	MERV 13	208	3	38	50	1220	130	4 / M3.1	1, 2, 3, 4, 5, 6, 8
HP 2B	TRANE WHK072A3	6	1950	580	0.6	2.75	454A	68,590	74,360	16.3	12.8	MERV 13	208	3	38	50	1220	130	4 / M3.1	1, 2, 3, 4, 5, 6, 8
HP 2C	TRANE WHK072A3	6	1950	580	0.6	2.75	454A	68,590	74,360	16.3	12.8	MERV 13	208	3	38	50	1220	130	4 / M3.1	1, 2, 3, 4, 5, 6, 8
HP 3A	TRANE WSK090A3	7.5	3000	750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	– / –	9
HP 3B	TRANE WHK090A3	7.5	3000	750	0.6	1.00	454A	81,730	86,910	15.5	12.0	MERV 13	208	3	43	50	1220	130	4 / M3.1	1, 2, 3, 4, 6, 8
HP 3C	TRANE WSK090A3	7.5	3000	750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	– / –	9
HP 3D	TRANE WHK090A3	7.5	3000	750	0.6	1.00	454A	81,730	86,910	15.5	12.0	MERV 13	208	3	43	50	1220	130	4 / M3.1	1, 2, 3, 4, 6, 8
HP 4	TRANE WHK036A3	3	1200	190	0.6	0.75	454A	32,310	36,660	16.2	12.8	MERV 13	208	3	23	30	950	155	5 / M3.1	2, 3, 4

NOTES:
1. ADAPTER CURB TO BE INSTALLED ONTO EXISTING ROOF CURB.
2. 100% DRY BULB ECONOMIZER.
3. GPS I-MOD MODULAR NEEDLEPOINT BIPOLAR IONIZER INSTALLED IN UNIT. 24V POWER FROM UNIT.
4. PROVIDE WITH I-VUE CONTROLS
5. PROVIDE WITH OCCUPANCY SENSOR
6. PROVIDE WITH SMOKE DETECTOR MOUNTED IN SUPPLY DUCT.
7. PROVIDE WITH ADAPTER CURB 0824-7400-DT
8. PROVIDE WITH ADAPTER CURB CA-TRN-543-TRN-545-11
9. EXISTING UNIT TO REMAIN

EXHAUST FAN SCHEDULE

SYM	MFR & MODEL #	AREA SERVICED	CFM	ESP	HP	ELECTRICAL V	PH	FAN RPM	WT	REMARKS	WIRING DETAIL
EF 1	GREENHECK G-095-VG	SEE PLAN	590	0.3	1/6	120	1	1050	50	1, 2	13 / M3.1
EF 2	GREENHECK G-140-VG	SEE PLAN	1475	0.5	1/2	120	1	1070	70	1, 2	13 / M3.1
EF 3	GREENHECK SP-A90-130-VG	SEE PLAN	100	0.4	15W	120	1	960	20	2, 3	14 / M3.1
EF 4	GREENHECK G-080-VG	SEE PLAN	250	0.5	1/10	120	1	1577	45	1, 2	15 / M3.1
EF 5	GREENHECK G-080-VG	SEE PLAN	400	0.3	1/10	120	1	1665	45	1, 2	14 / M3.1

NOTES:
1. 12" ROOF CURB
2. BACKDRAFT DAMPER
3. ROOF CAP W/CURB.

SPLIT SYSTEM OUTDOOR HEAT PUMP UNIT SCHEDULE

SYM	MFR & MODEL #	NOMINAL TONS	REFRIG.	COOLING TOTAL CAPACITY (BTU/h)	COOLING SENSIBLE CAPACITY (BTU/h)	SEER	EER	AMBIENT (°F DB)	INDOOR UNIT	ELECTRICAL V	PH	MCA	MOCP	MAX OPER. WEIGHT (LBS)	REMARKS	ANCHORAGE DETAIL
CU 1	TRANE TUY-GX18NL	1.5	R-454B	18,000	13,140	22.5	14.1	80.0/67.0	FC 1	208	1	14.0	25	120	1	8 / M3.1

1. (N) 6" ROOF PAD.

SPLIT SYSTEM INDOOR WALL MOUNTED FAN COIL UNIT SCHEDULE

SYM	MFR & MODEL #	AREA SERVICED	NOMINAL TONS	CFM	FAN POWER (WATT)	OUTDOOR UNIT	ELECTRICAL V	PH	MCA	MOCP	WEIGHT (LBS)	REMARKS	ANCHORAGE DETAIL
FC 1	TRANE TSY-GX18NL	IDF	1.5	400	-	CU 1	POWERED BY OUTDOOR UNIT				40	1	7 / M3.1

1. WALL MOUNTED CONDENSATE PUMP

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MECHANICAL SCHEDULES

SHEET
M0.2

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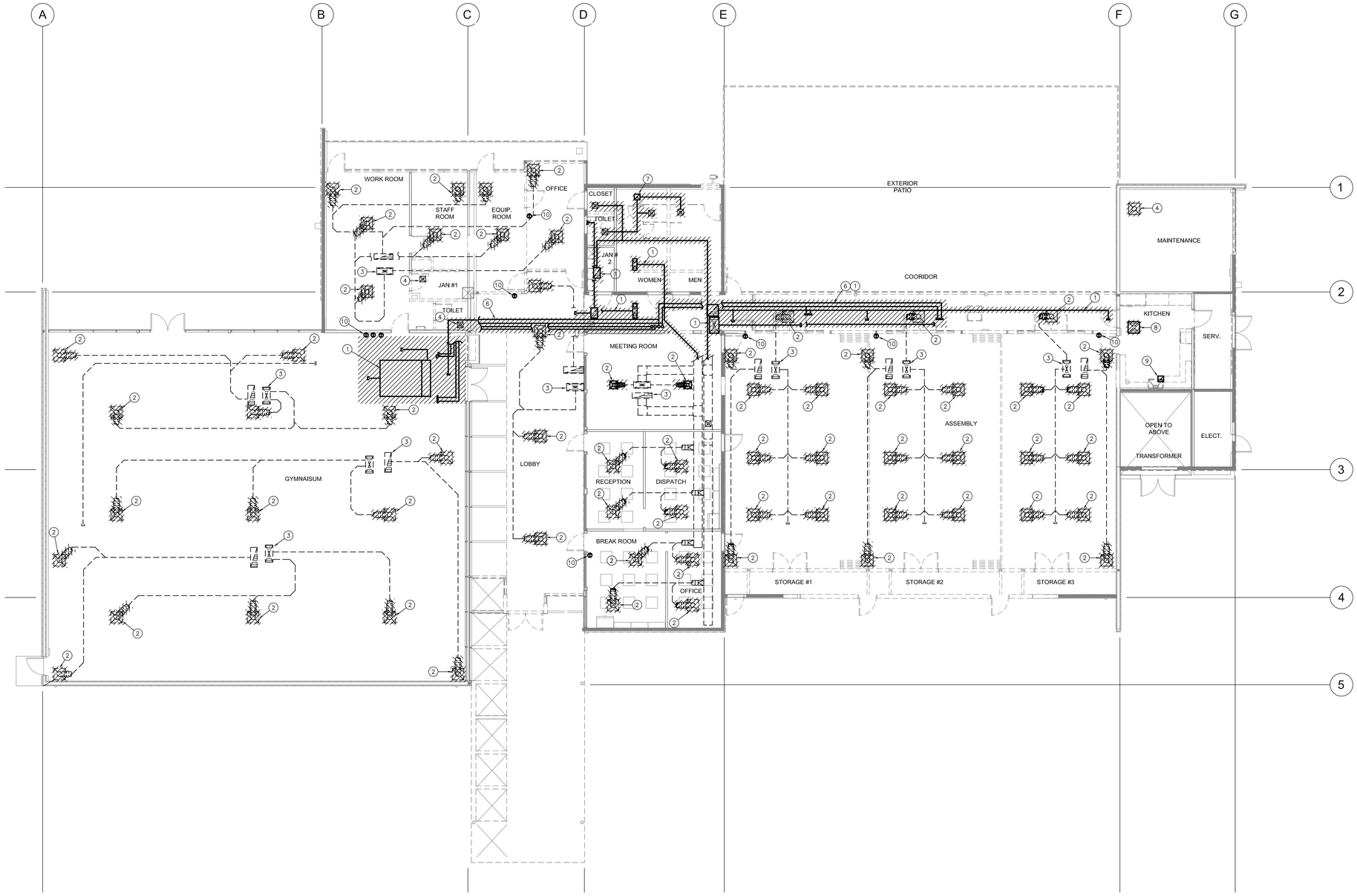

DEMOLITION NOTES:

1. CITY SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL ITEMS TO BE REMOVED. CONTRACTOR SHALL VERIFY ALL SUCH ITEMS WITH CITY PRIOR TO REMOVAL. ALL ITEMS NOT REFUSED BY CITY SHALL BE REMOVED INTACT AND FULLY FUNCTIONAL BY CONTRACTOR AND RETURNED TO CITY. ALL ITEMS REFUSED BY CITY SHALL BE PROPERLY DISPOSED OF BY CONTRACTOR.
2. CONTRACTOR SHALL RE-USE EXISTING OPENINGS IN WALLS AND ROOF WHEREVER POSSIBLE. COORDINATE WITH OTHER TRADES AS NECESSARY. GENERAL CONTRACTOR SHALL MODIFY OPENING AS REQUIRED TO ACCOMMODATE NEW MECHANICAL DEVICE.
3. GENERAL CONTRACTOR SHALL PATCH ALL OPENINGS IN WALLS, ROOF, ETC. THAT WILL NOT BE REUSED FOR FUTURE WORK. COORDINATE AS NECESSARY WITH OTHER TRADES.
4. PRIOR TO ANY WORK BEING DONE CONTRACTOR SHALL MAKE A CAREFUL EVALUATION OF THE EXISTING CONDITIONS AND VERIFY ALL METHODS OF REMOVAL AND INSTALLATION OF MECHANICAL EQUIPMENT.
5. CONTRACTOR SHALL COORDINATE ALL DEMOLITION WORK WITH THE WORK OF ALL OTHER TRADES.
6. EXISTING ABANDONED OR DEFUNCT PIPING, FLUES, DUCT, VENTS, & ETC. SHALL BE REMOVED. PATCH AND REPAIR WALLS/ROOF AS NECESSARY.

DEMOLITION KEY NOTES:

(1) DEMO AND REMOVE EXISTING ABANDONED AIR HANDLING EQUIPMENT AND ASSOCIATED DUCTWORK, POWER, PIPING, ETC. AT EXISTING MEZZANINE.
(2) DEMO AND REMOVE EXISTING SUPPLY DIFFUSERS AND ASSOCIATED BRANCH DUCT TO LOCATION INDICATED.
(3) EXISTING SUPPLY AND RETURN DUCTWORK UP THRU ROOF TO REMAIN.
(4) DEMO AND REMOVE EXISTING EXHAUST FAN UP THROUGH ROOF DUCT AND ROOF CAP.
(5) DEMO AND REMOVE EXISTING EXHAUST FAN UP THROUGH ROOF DUCT AND ROOF CAP.
(6) DEMO AND REMOVE ALL EXISTING ABANDONED HYDRONIC PIPING WITHIN BUILDING.
(7) DEMO EXISTING EXHAUST DUCT, CEILING REGISTERS, AND ASSOCIATED EXHAUST FAN AT MEZZANINE.
(8) DEMO AND REMOVE EXISTING SUPPLY REGISTER AND ASSOCIATED MAKEUP AIR DUCT UP THRU ROOF.
(9) DEMO AND REMOVE HOOD EXHAUST DUCT AND ASSOCIATED EXHAUST FAN ON ROOF.

NORTH

SCALE 1/8"=1'-0" | 1

MECHANICAL DEMOLITION FLOOR PLAN

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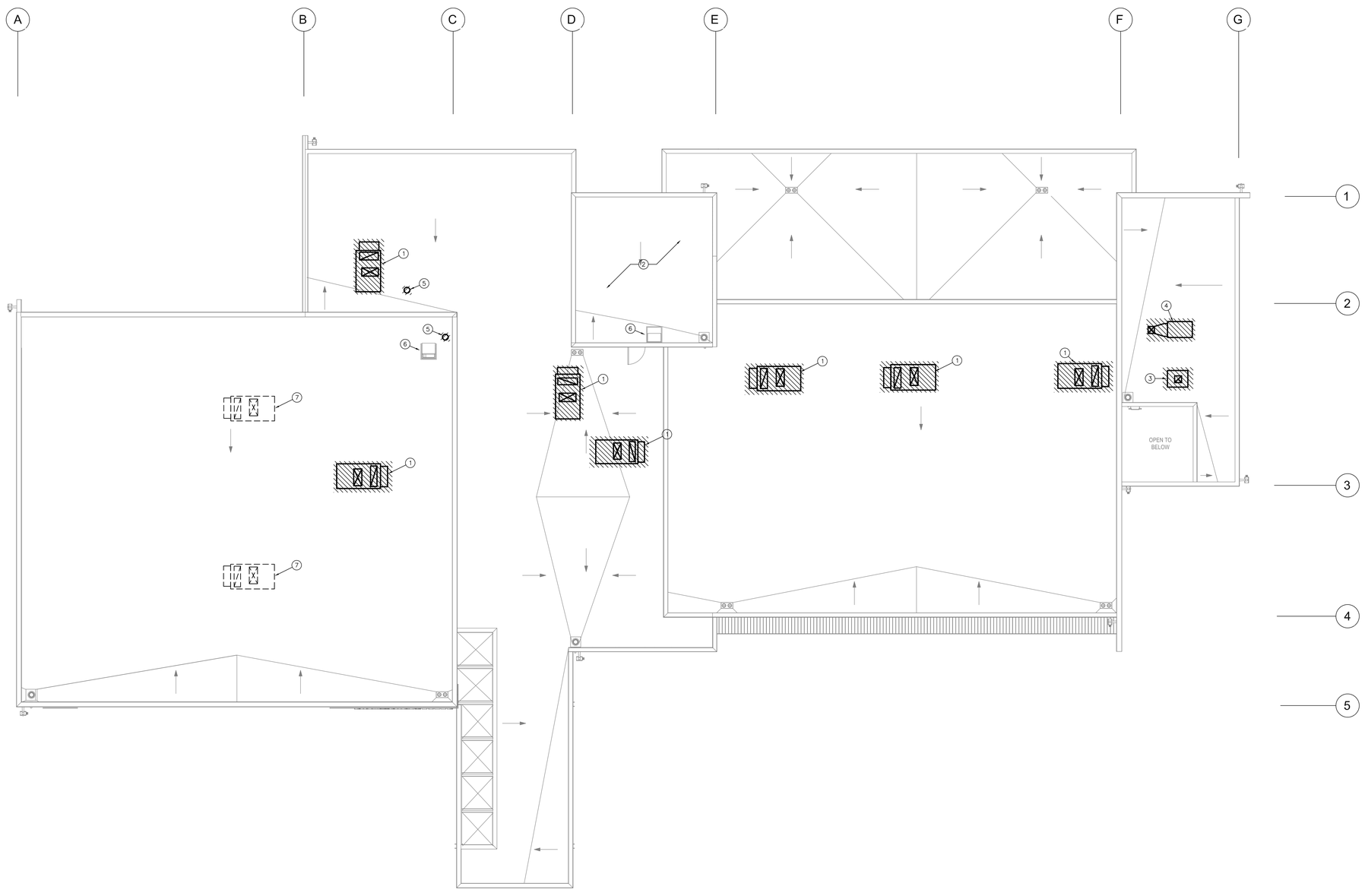
MECHANICAL DEMOLITION FLOOR PLAN

SHEET
M1.1



DEMOLITION NOTES:

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3. GENERAL CONTRACTOR SHALL PATCH ALL OPENINGS IN WALLS, ROOF, ETC. THAT WILL NOT BE REUSED FOR FUTURE WORK. COORDINATE AS NECESSARY WITH OTHER TRADES.
4. PRIOR TO ANY WORK BEING DONE CONTRACTOR SHALL MAKE A CAREFUL EVALUATION OF THE EXISTING CONDITIONS AND VERIFY ALL METHODS OF REMOVAL AND INSTALLATION OF MECHANICAL EQUIPMENT.
5. CONTRACTOR SHALL COORDINATE ALL DEMOLITION WORK WITH THE WORK OF ALL OTHER TRADES.
6. EXISTING ABANDONED OR DEFUNCT PIPING, FLUES, DUCT, VENTS, & ETC. SHALL BE REMOVED. PATCH AND REPAIR WALLS/ROOF AS NECESSARY.

DEMOLITION KEY NOTES:

(1) DEMO AND REMOVE EXISTING PACKAGED A/C UNIT ON ROOF. EXISTING CURB TO REMAIN.
(2) DEMO AND REMOVE EXISTING ABANDONED MECHANICAL EQUIPMENT IN EXISTING MECHANICAL ROOM.
(3) DEMO AND REMOVE EXISTING KITCHEN EXHAUST FAN AND ALL ASSOCIATED DUCTWORK.
(4) DEMO AND REMOVE EXISTING KITCHEN MAKEUP AIR UNIT AND ALL ASSOCIATED DUCTWORK.
(5) DEMO AND REMOVE EXISTING EXHAUST CAP AND ASSOCIATED DUCTWORK DOWN THRU ROOF.
(6) EXISTING ROOF ACCESS HATCH TO REMAIN.
(7) EXISTING ROOFTOP UNIT TO REMAIN.

NORTH

MECHANICAL DEMOLITION ROOF PLAN

SCALE 1/8"=1'-0" | 1

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DRAWN Author
CHECK Checker

MECHANICAL DEMOLITION ROOF PLAN

SHEET M1.2

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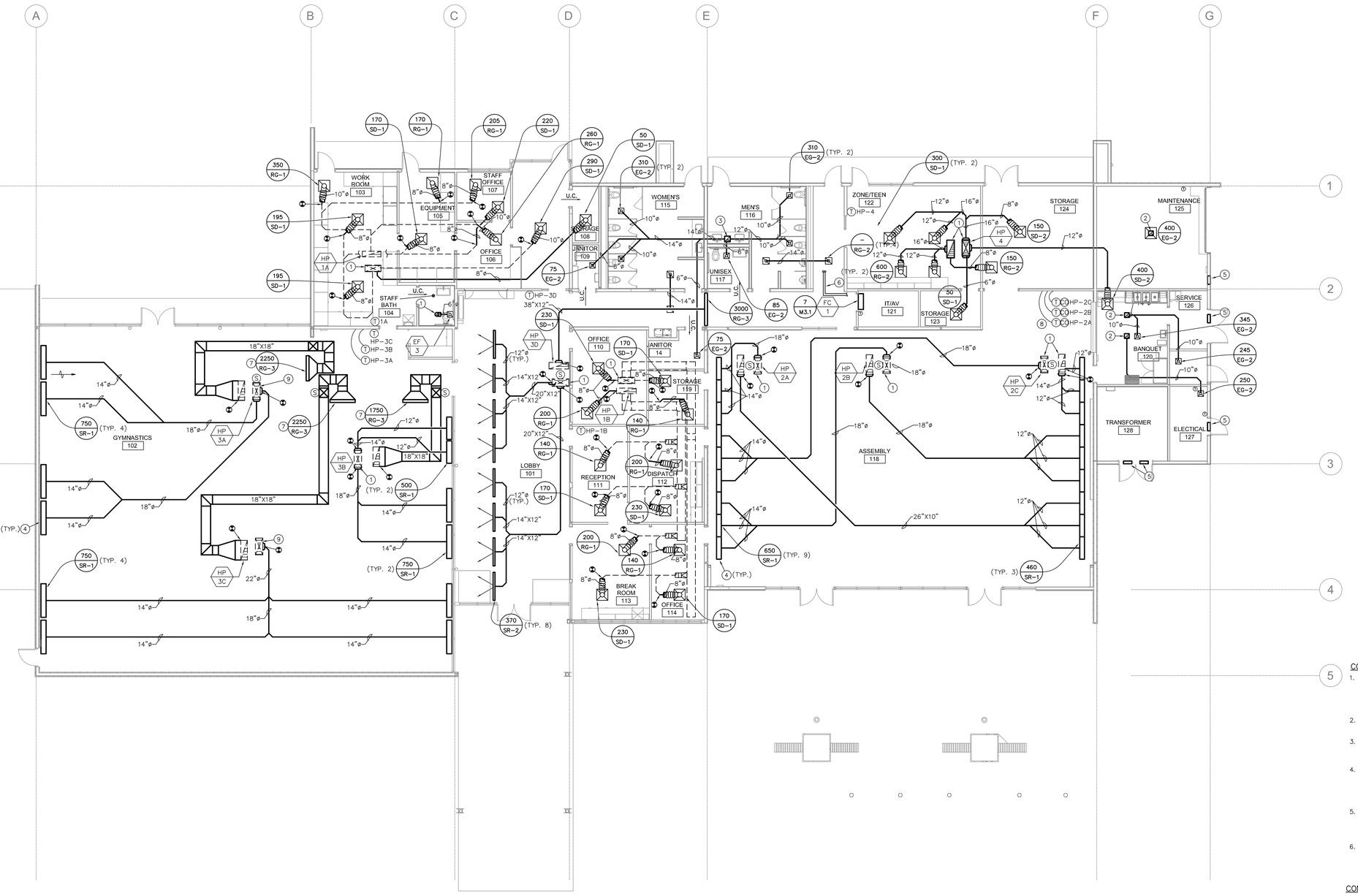

CONSTRUCTION NOTES:

1. MANUAL VOLUME DAMPERS SHALL BE PROVIDED IN ALL DUCT BRANCHES TO INDIVIDUAL DIFFUSERS. PROVIDE NEW DAMPERS IN EXISTING DUCTWORK WHERE REQUIRED. DAMPERS SHALL BE LOCATED AS CLOSE TO THE MAIN DUCT AS POSSIBLE.
2. PROVIDE MAXIMUM 5'-0" OF ACOUSTICAL FLEX DUCT TO EACH DIFFUSER.
3. FIELD VERIFY ALL EXISTING DUCT DIMENSIONS INDICATED PRIOR TO FABRICATION. PROVIDE ALL TRANSITIONS AS REQUIRED TO CONNECT NEW DUCTWORK TO EXISTING.
4. COORDINATE ENTIRE INSTALLATION OF THE HVAC SYSTEM WITH THE WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS, AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
5. COORDINATE THE LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS AND GRILLES WITH THE ARCHITECTURAL REFLECTIVE CEILING PLAN, ELECTRICAL LIGHTING LAYOUT AND ARCHITECTURAL ROOM ELEVATIONS.
6. BEFORE COMMENCEMENT OF WORK, THE MECHANICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS AND DIMENSIONS OF ALL EXISTING EQUIPMENT AND ELECTRICAL SERVICES IN THE AREA OF NEW CONSTRUCTION AND NOTIFY THE DISTRICT OF ANY DISCREPANCIES.

CONSTRUCTION KEY NOTES:

1. EXISTING SUPPLY AND RETURN DUCTWORK UP TO NEW A/C UNIT ON ROOF ABOVE.
2. 10"x10" EXHAUST DUCTWORK UP TO NEW EXHAUST FAN ON ROOF ABOVE.
3. 12"x12" EXHAUST DUCTWORK UP TO NEW EXHAUST FAN ON ROOF ABOVE.
4. LINEAR DIFFUSER TO BE INSTALLED IN CEILING. FIRE DAMPER TO BE PROVIDED WHERE DUCTWORK PENETRATES RATED ENCLOSURE. SEE DETAIL 10/M3.1.
5. PROVIDE DOOR LOUVER WITH MINIMUM 1 SQ FT OF FREE AREA.
6. REFRIGERANT PIPING TO FAN COIL FC-1 UP THRU ROOF TO CONDENSING UNIT CU-1. CONTRACTOR TO VERIFY PIPING SIZE AND ROUTING WITH MANUFACTURER PRIOR TO ORDERING.
7. RETURN AIR GRILLE TO BE INSTALLED ON VERTICAL FACE OF SOFFIT. SEE ARCH DWGS FOR EXACT LOCATION.
8. CO2 SENSOR TO BE INSTALLED NEXT TO THERMOSTAT.
9. NEW DUCTWORK TO BE CONNECTED TO EXISTING DUCT RISER.

NORTH

MECHANICAL RENOVATION FLOOR PLAN

SCALE 1/8"=1'-0" | 1

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CHECK	**Checker**

MECHANICAL RENOVATION FLOOR PLAN

SHEET
M2.1

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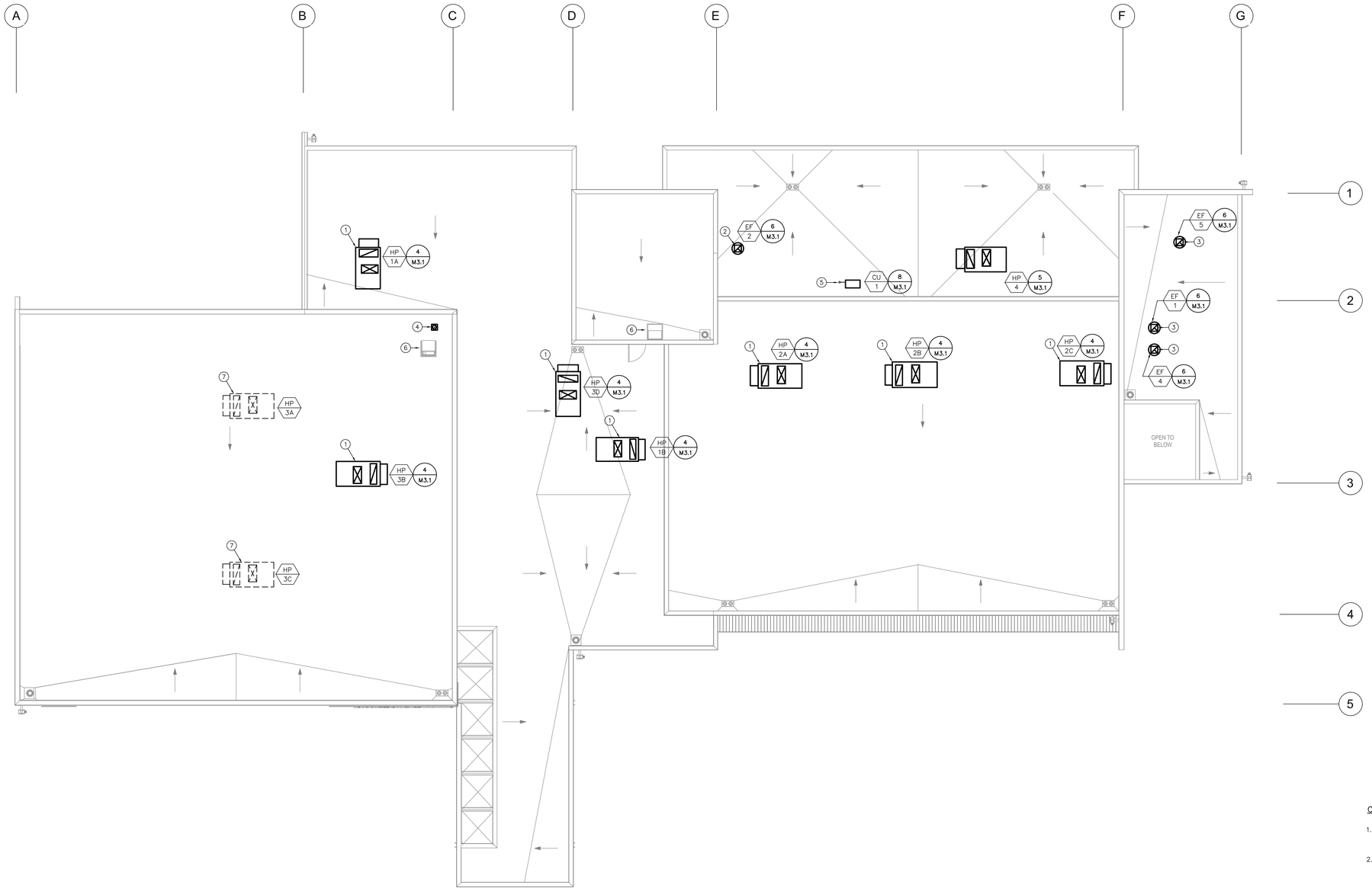

CONSTRUCTION NOTES:

1. MAINTAIN A MINIMUM OF 10'–0" CLEARANCE FOR ALL OUTSIDE AIR INTAKES FROM PLUMBING VENTS, FLUES, EXHAUST DISCHARGES, ETC.
2. COORDINATE ENTIRE INSTALLATION OF THE HVAC SYSTEM WITH THE WORK OF ALL OTHER TRADES PRIOR TO ANY FABRICATION OR INSTALLATION. PROVIDE ALL FITTINGS, OFFSETS, AND TRANSITIONS AS REQUIRED FOR A COMPLETE WORKABLE INSTALLATION.
3. BEFORE COMMENCEMENT OF WORK, THE MECHANICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS AND DIMENSIONS OF ALL EXISTING EQUIPMENT AND ELECTRICAL SERVICES IN THE AREA OF NEW CONSTRUCTION AND NOTIFY THE DISTRICT OF ANY DISCREPANCIES.

CONSTRUCTION KEY NOTES:

(1) INSTALL NEW A/C UNIT ON EXISTING ROOF CURB. EXISTING SUPPLY AND RETURN DUCT DOWN THRU ROOF TO REMAIN.
(2) 12"x12" EXHAUST DUCT DOWN THRU ROOF.
(3) 10"x10" EXHAUST DUCT DOWN THRU ROOF.
(4) MANUFACTURER EXHAUST DISCHARGE CAP WITH CURB. SEE DETAIL 10, M3.1
(5) REFRIGERANT PIPING DOWN THRU ROOF. SEE DETAIL 9, SHEET M3.1.
(6) EXISTING ROOF ACCESS HATCH TO REMAIN.
(7) EXISTING UNIT TO REMAIN

NORTH

MECHANICAL RENOVATION ROOF PLAN

SCALE 1/8"=1'–0" | 1

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DRAWN Author
CHECK Checker

MECHANICAL
RENOVATION
ROOF PLAN

SHEET
M2.2

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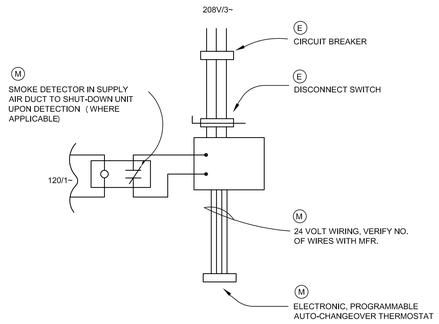
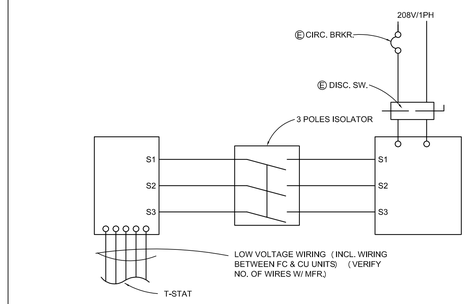


PACKAGED AC UNIT WIRING DIAGRAM

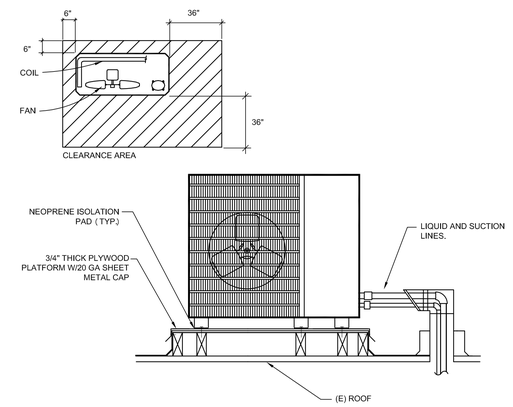
SCALE: NONE | 16



NOTES:
1. INSTALL PER MANUFACTURER'S GUIDELINES.
2. PROVIDE ROOM TEMPERATURE SENSOR TO MONITOR STATUS ONLY. CONNECT TO EMS (BY CONTROLS CONTRACTOR) .

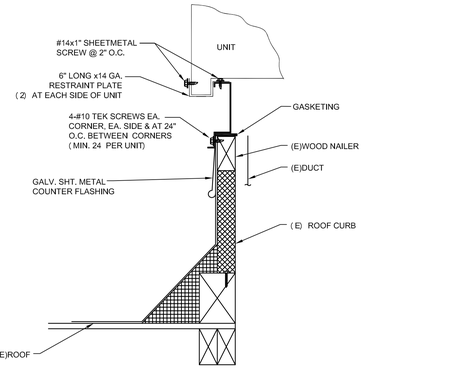
SPLIT SYSTEM HEAT PUMP WIRING DIAGRAM

SCALE: NONE | 12



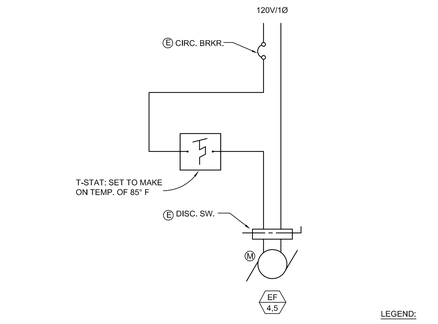
ROOFTOP CONDENSING UNIT ANCHORAGE DETAIL

SCALE: NONE | 8



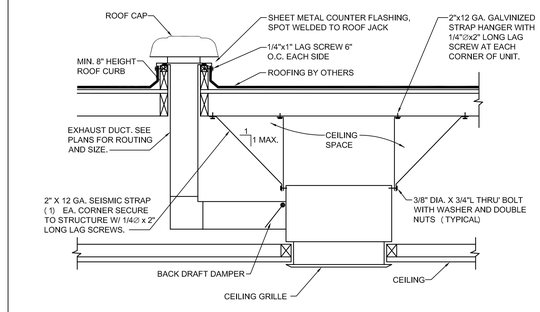
TYP. ROOFTOP A/C UNIT ANCHORAGE DETAIL

SCALE: NONE | 4



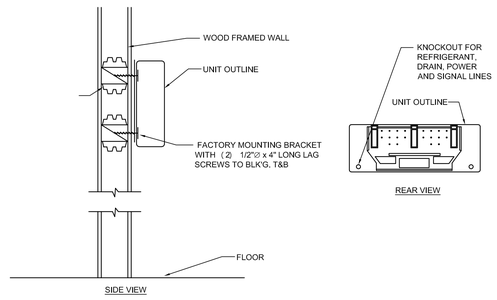
THERMOSTAT EXHAUST FAN WIRING DIAGRAM

SCALE: NONE | 15



CEILING EXHAUST FAN ANCHORAGE DETAIL

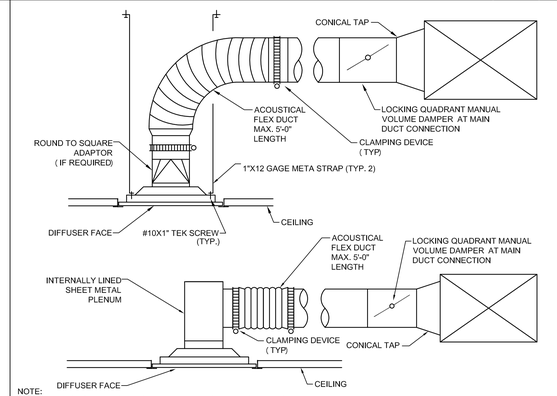
SCALE: NONE | 11



NOTES:
1. MAINTAIN MFR. RECOMMENDED MIN. CLEARANCES.
2. REFRIGERANT IS METERED BY CAPILLARY TUBES IN THE OUTDOOR UNIT. INSULATE BOTH REFRIGERANT LINES.
3. REFRIGERANT, DRAIN, AND POWER CONNECTIONS MAY BE MADE IN UNIT REAR, BOTTOM, LEFT SIDE OR RIGHT SIDE.
4. INSTALLATION SHALL COMPLY WITH MFR. GUIDELINES.

FAN COIL UNIT ANCHORAGE DETAIL

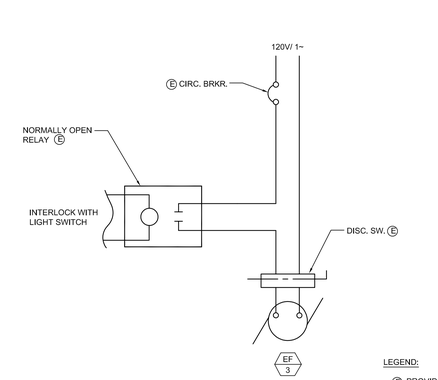
SCALE: NONE | 7



NOTE:
FLEXIBLE DUCT SHALL NOT EXCEED 5'-0" IN LENGTH AND SHALL NOT BE USED IN LIEU OF A RIGID ELBOW OR TRANSITION PER CMC REQUIREMENTS.

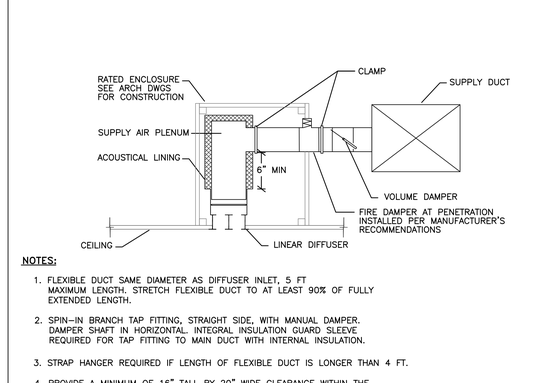
CEILING DIFFUSER DETAIL

SCALE: NONE | 3



LIGHT-SWITCH EXHAUST FAN WIRING DIAGRAM

SCALE: NONE | 14

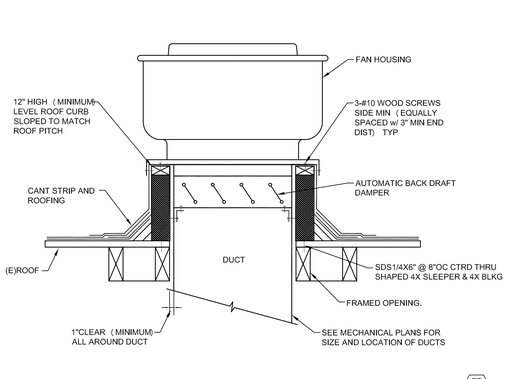


NOTES:

1. FLEXIBLE DUCT SAME DIAMETER AS DIFFUSER INLET, 5 FT MAXIMUM LENGTH. STRETCH FLEXIBLE DUCT TO AT LEAST 90% OF FULLY EXTENDED LENGTH.
2. SPIN–IN BRANCH TAP FITTING, STRAIGHT SIDE, WITH MANUAL DAMPER. DAMPER SHAFT IN HORIZONTAL. INTEGRAL INSULATION GUARD SLEEVE REQUIRED FOR TAP FITTING TO MAIN DUCT WITH INTERNAL INSULATION.
3. STRAP HANGER REQUIRED IF LENGTH OF FLEXIBLE DUCT IS LONGER THAN 4 FT.
4. PROVIDE A MINIMUM OF 16" TALL BY 20" WIDE CLEARANCE WITHIN THE RATED ENCLOSURE FOR LINEAR DIFFUSER, FIRE DAMPER, AND ACCESSORIES.

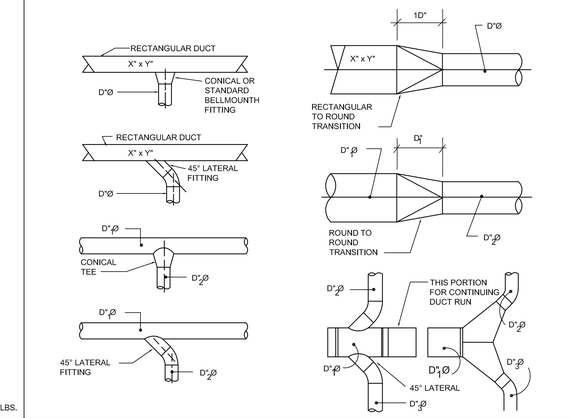
TYP. LINEAR DIFFUSER DETAIL

SCALE: NONE | 10



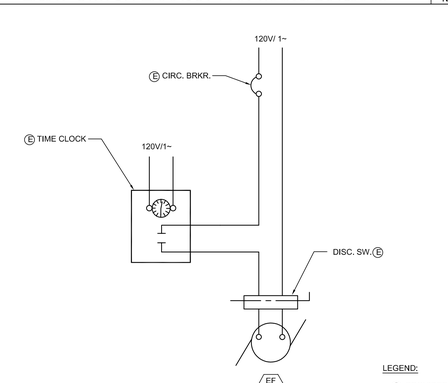
TYP. EXHAUST FAN ANCHORAGE DETAIL

SCALE: NONE | 6



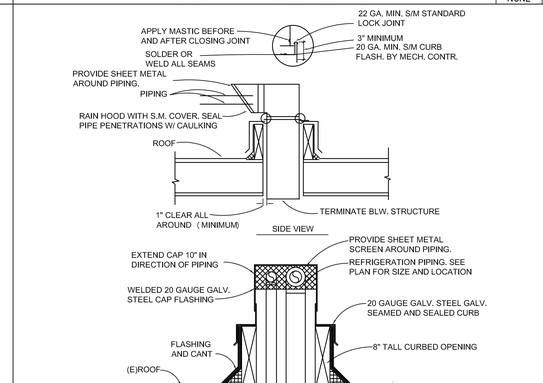
DUCTWORK TRANSITION DETAIL

SCALE: NONE | 2



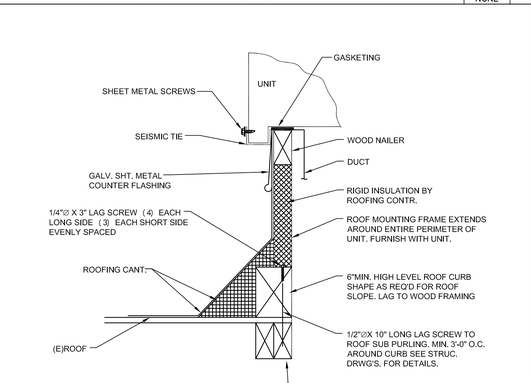
TIME-CLOCK EXHAUST FAN WIRING DIAGRAM

SCALE: NONE | 13



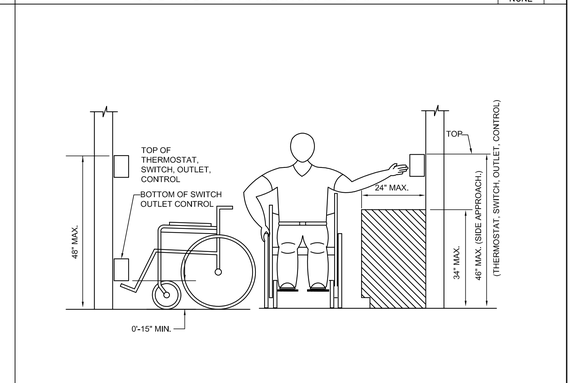
REFRIGERANT PIPING THROUGH ROOF DETAIL

SCALE: NONE | 9



TYP. ROOFTOP A/C UNIT ANCHORAGE DETAIL

SCALE: NONE | 5



THERMOSTAT MOUNTING DETAIL

SCALE: NONE | 1

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CITY OF LAKEWOOD CALIFORNIA

CLIENT

PDS
PocockDesignSolutions Inc.

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

X REVISIONS

REGISTERED PROFESSIONAL ENGINEER
ANDREW R. GUSSMAN
No. M26670
Exp. 3/31/26
MECHANICAL
STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

MECHANICAL DETAILS

SHEET
M3.1

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SEQUENCE OF OPERATION

EXHAUST FAN
EF-1 AND EF-2 SHALL RUN BASED ON AN OCCUPIED TIME SCHEDULE (ADJUSTABLE) .
EF-4 AND EF-5 SHALL RUN WHENEVER THEIR RESPECTIVE ZONE TEMPERATURE IS ABOVE 80°F (ADJUSTABLE) .

SPACE TEMPERATURE MONITORING
SPLIT AIR CONDITIONER (FC/CU-1) SHALL BE CONTROLLED BY THE UNIT MANUFACTURER'S THERMOSTAT AND MONITORED ONLY BY THE EMS SPACE TEMPERATURE MONITOR SENSOR. A HIGH TEMPERATURE LIMIT ALARM SHALL BE GENERATED BY THE I-VU WEB SERVER.

ROOFTOP UNIT CONTROLLER

INDOOR FAN
DURING OCCUPIED PERIODS, THE FAN SHALL OPERATE CONTINUOUSLY. DURING UNOCCUPIED PERIODS, THE FANN SHALL OPERATE WHEN THE SPACE TEMPERATURE EXCEEDS THE UNOCCUPIED HEATING OR COOLING SETPOINTS (ADJ) . THE FAN OPERATES AT 1 OF 2 SPEEDS DEPENDING ON THE MODE OF OPERATION AND LOAD CONDITIONS. DURING VENT-ONLY MODE AND LOW LOAD CONDITIONS, THE FAN OPERATES AT LOW SPEED. IF LOAD CONDITIONS INCREASE OR IF THERE IS A CALL FOR HEATING, THE FAN OPERATES AT HIGH SPEED.

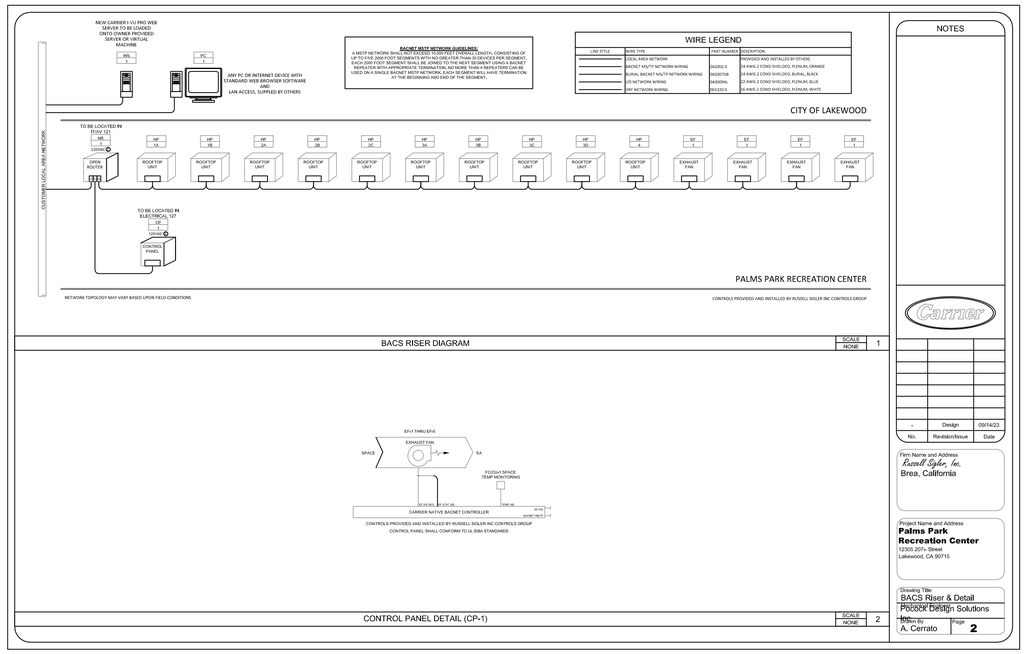
HEATING MODE
WHEN SPACE TEMPERATURE IS BELOW THE OCCUPIED HEATING SETPOINT, UNIT SHALL OPERATE IN THE HEATING MODE. UNIT SHALL STAGE AVAILABLE HEAT STAGES TO SATISFY DEMAND IN THE OCCUPIED SPACE.

COOLING MODE
WHEN SPACE TEMPERATURE IS ABOVE OCCUPIED COOLING SETPOINT, UNIT SHALL OPERATE IN THE COOLING MODE. UNIT SHALL ENABLE AVAILABLE MECHANICAL COOLING STAGES TO SATISFY DEMAND IN THE OCCUPIED SPACE.

ECONOMIZER
ECONOMIZER SHALL CLOSE WHEN FAN IS OFF OR DURING A LOSS OF POWER. DURING OCCUPIED HOURS WHEN FAN IS ENERGIZED, THE ECONOMIZER SHALL OPEN TO ADJUSTABLE MINIMUM POSITION, WHEN OUTSIDE AIR TEMPERATURE IS BELOW 71°F (ADJ) AND OCCUPIED SPACE REQUIRES COOLING, ECONOMIZER SHALL OPEN. IF ECONOMIZER AIR IS NOT SUFFICIENT TO MEET THE DEMAND IN THE OCCUPIED SPACE, UNIT SHALL ENABLE AVAILABLE MECHANICAL COOLING STAGES TO SATISFY DEMAND IN THE OCCUPIED SPACE.

CO2 CONTROL
UNIT SHALL MONITOR SPACE CO2 WHEN THE SUPPLY FAN IS ENERGIZED. WHEN CO2 IS ABOVE SETPOINT OF 1000 PPM, ECONOMIZER SHALL MODULATE OPEN TOWARD AN ADJUSTABLE MAXIMUM CO2 POSITION. AS THE CO2 LEVEL IN THE SPACE INCREASES ABOVE THE SETPOINT, THE MINIMUM POSITIONS FO THE DAMPERS WILL BE INCREASED PROPORTIONALLY UNTIL THE MASIMUM VENTILATION SETTING IS REACHED. AS THE SPACE CO2 LEVEL DECREASES BECAUSE OF THE INCREASE IN FRESH AIR, THE OUTDOOR DAMPER WILL FOLLOR THE HIGHER DEMAND CONDITION FROM THE DCV MODE OR FROM THE FREE-COOLING MODE.

REFRIGERANT MITIGATION MODE
UNIT CONTROLLER WILL MONITOR THE LEAK DETECTION SYSTEM, WHEN A LEAK IS DETECTED, AN ALARM WILL PROMPTLY ALERT THE BAS VIA BACNET CHANGE-OF-VALUE AND MITIGATION WILL BE ACTIVATED. IN OCCUPIED MODE, THE SUPPLY FAN WILL REMAIN OPERATIONAL AND THE COMPRESSOR (S) WILL BE DISABLED FOR THE DURATION OF THE MITIGATION PROCESS PLUS AN ADDITIONAL 5 MINUTES. IN UNOCCUPIED MODE, THE SUPPLY FAN WILL ACTIVATE WITHIN 15 SECONDS WHILE THE COMPRESSOR (S) WILL BE DISABLED FOR THE DURATION OF THE MITIGATION PROCESS PLUS AN ADDITIONAL 5 MINUTES.



BACS RISER DIAGRAM — SCALE NONE — 1

CONTROL PANEL DETAIL (CP-1) — SCALE NONE — 2

NOTES

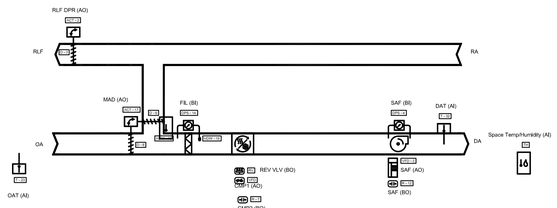
Carrier

No.	Revision/Issue	Date
-	Design	09/14/23

Firm Name and Address
Russell Sigler, Inc.
Brea, California

Project Name and Address
Palms Park Recreation Center
12305 207th Street
Lakewood, CA 90715

Drawing Title: BACS Riser & Detail
Prepared for: Pocock Design Solutions
Drawn By: A. Cerrato
Page: **2**



ROOFTOP UNIT DETAIL (HP-1A, HP-1B, HP-2A, HP-2B, HP-2C, HP-3A, HP-3B, HP-3C, HP-3D AND HP-4) — SCALE NONE — 1

EXHAUST FAN DETAIL — SCALE NONE — 2

NOTES

Carrier

No.	Revision/Issue	Date
-	Design	09/14/23

Firm Name and Address
Russell Sigler, Inc.
Brea, California

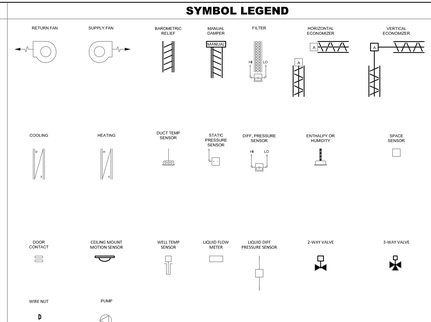
Project Name and Address
Palms Park Recreation Center
12305 207th Street
Lakewood, CA 90715

Drawing Title: Detail 1
Prepared for: Pocock Design Solutions
Drawn By: A. Cerrato
Page: **3**

COMMON ABBREVIATIONS

ABBREVIATION	DESCRIPTION
AC	AIR CONDITIONING
ACU	AIR CONDITIONING UNIT
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AO	ANALOG OUTPUT
AUTO	AUTOMATIC
AUX	AUXILIARY
BAI	BACNET ANALOG INPUT
BAO	BACNET ANALOG OUTPUT
BBI	BACNET BINARY INPUT
BBO	BACNET BINARY OUTPUT
BI	BINARY INPUT
BO	BINARY OUTPUT
C	COMMON
CHW	CHILLED WATER
CHWP	CHILLED WATER PUMP
CHWR	CHILLED WATER RETURN
CHWS	CHILLED WATER SUPPLY
COND	CONDENSER
CW	CONDENSER WATER
CWP	CONDENSER WATER PUMP
CWR	CONDENSER WATER RETURN
CWS	CONDENSER WATER SUPPLY
DA	DISCHARGE AIR
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
EA	EXHAUST AIR
EF	EXHAUST FAN
EVAP	EVAPORATOR
F	FAHRENHEIT
FCU	FAN COIL UNIT
HOA	HAND/OFF/AUTO
HP	HEAT PUMP
HRU	HEAT RECOVERY UNIT
HTEX	HEAT EXCHANGER
HW	HOT WATER
HWP	HOT WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
MAX	MAXIMUM
MIN	MINIMUM
MISC	MISCELLANEOUS
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTDOOR AIR
RA	RETURN AIR
RF	RETURN FAN
RH	RELATIVE HUMIDITY
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SF	SUPPLY FAN
SP	STATIC PRESSURE
TEMP	TEMPERATURE
UH	UNIT HEATER
UV	UNIT VENTILATOR
VAV	VARIABLE AIR VOLUME
VAVTU	VARIABLE AIR VOLUME TERMINAL UNIT
VVT	VARIABLE VOLUME & TEMPERATURE
W/	WITH
W/O	WITHOUT
WSHP	WATER SOURCE HEAT PUMP

SYMBOL LEGEND



GENERAL INFORMATION

COMMUNICATION BUS SPECIFICATION
1. A 24 AWG 2-conductor/shielded-stranded cable (plenum rated as required) must be daisy chained from controller to controller. It should be color coded (red, black, white).
2. The communication cable operates at up to 5 VDC. Verify with the local code authority and specs regarding conduit requirements.
3. No "T" tap or "star" type connections are permitted.
4. Terminate the shields on the designated terminal at each device.
5. 20 controller's maximum per communication bus segment. 60 controller's maximum per network router.
6. A repeater is required every 2000 ft. or 30 devices. Maximum of 4 repeaters per bus for a total of 10,000 ft.

GENERAL NOTES
1. The 2 conductor communication cable and sensor cables must always be in a separate jacket from one another. Never run the
se cables in the same conduit as, or
bundle them with, AC power wiring of any voltage. Do not strap these cables along any conduits that contain AC power wiring of any voltage,
Do not run these cables in rings or conduit with fire, life, safety, security, network, telephone, power, or other wiring. When running communication and
sensor wiring parallel to other cabling or conduit maintain a 12 in. distance.
2. Ethernet and/or Internet connection to I-Vu are supplied and maintained by building owner/operator.
3. Provide 120VAC power to CARRIER NETWORK
4. Installer shall coordinate all power and data connection requirements with the GC onsite.
5. Install all components in accordance with the specification, applicable codes and manufacturer
's literature

NOTES

Carrier

No.	Revision/Issue	Date
-	Design	09/14/23

Firm Name and Address
Russell Sigler, Inc.
Brea, California

Project Name and Address
Palms Park Recreation Center
12305 207th Street
Lakewood, CA 90715

Drawing Title: Legend
Prepared for: Pocock Design Solutions
Drawn By: A. Cerrato
Page: **1**

CONTROLS DIAGRAMS — SCALE 1/8"=1'-0" — 1

DAHLIN
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CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REVISIONS

SEAL / SIGNATURE

REGISTERED PROFESSIONAL ENGINEER — ANDREW R. GOSSARD — No. M26670 — Exp. 12/31/24 — MECHANICAL — STATE OF CALIFORNIA

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

MECHANICAL DETAILS

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M3.2

3/4/2023 12:58:15 PM

Project Name: Palms Community Center **Date Prepared:** 2024-06-06

A. General Information

1	Project Name	Palms Community Center			
2	Run Title	Title 24 Analysis			
3	Project Location	12305 207th Street			
4	City	Lakewood	5	Standards Version	Compliance 2022
6	Zip code	90715	7	Compliance Software (version)	EnergyPro 9.1
8	Climate Zone	8	9	Building Orientation (deg)	0
10	Building Type(s)	• Nonresidential	11	Weather File	FULLERTON_STYP20.epw
12	Project Scope	• Existing addition and alteration	13	Number of Dwelling Units	0
14	Total Conditioned Floor Area in Scope (ft^2)	14240	15	Total # of hotel/motel rooms	0
16	Total Unconditioned Floor Area (ft^2)	0	17	Fuel Type	Natural gas
18	Nonresidential Conditioned Floor Area	14240	19	Total # of Stories (Habitable Above Grade)	1
20	Residential Conditioned Floor Area	0			

B. PROJECT SUMMARY

Table B shows which building components are included in the performance calculation. If indicated as not included, the project must show compliance prescriptively if within the permit application.

Building Components Complying via Performance					Building Components Complying Prescriptively	
Envelope (See Table G)	Nonres	Performance	☐	Performance	The following building components are ONLY eligible for prescriptive compliance and should be documented on the NRCC form listed if within the scope of the permit application (i.e. compliance will not be shown on the NRCC-PRF-E).	
	MultiFam	Not Included	☒	Not Included		
Mechanical (See Table H)	Nonres	Performance	☐	Performance	Indoor Lighting (Unconditioned) 140.6 & 170.2(e)	NRCC-LTI-E is required
	MultiFam	Not Included	☒	Not Included	Outdoor Lighting 140.7 & 170.2(e)	NRCC-LTO-E is required
Domestic Hot Water (See Table I)	Nonres	Not Included	☐	Performance	Sign Lighting 140.8 & 170.2(e)	NRCC-LTS-E is required
	MultiFam	Not Included	☒	Not Included	**Building Components Complying with Mandatory Measures**	
Lighting (Indoor Conditioned, see Table K)	Nonres	Performance	☐	Performance	Electrical power systems, commissioning, solar ready, elevator and escalator requirements are mandatory and should be documented on the NRCC form listed if applicable (i.e. compliance will not be shown on the NRCC-PRF-E.)	
	MultiFam	Not Included	☒	Not Included	Electrical Power Distribution 110.11	NRCC-ELC-E is required
			☐	Performance	Commissioning 120.8	NRCC-CXR-E is required
			☒	Not Included	Solar and Battery 110.10	NRCC-SAB-E is required

Solar Thermal Water Heating (See Table I3) — ☒ Not Included
Covered Process: Commercial Kitchens (see Table J) — ☐ Performance; ☒ Not Included
Covered Process: Laboratory Exhaust (see Table J) — ☐ Performance; ☒ Not Included
Photovoltaics (see Table F) — ☐ Performance; ☒ Not Included
Battery (see Table F) — ☐ Performance; ☒ Not Included

C1. COMPLIANCE SUMMARY

	COMPLIES[1]		
	Time Dependent Valuation (TDV)		Source Energy Use
	Efficiency[2] (kBtu/ft² - yr)	Total[2] (kBtu/ft² - yr)	Total[2] (kBtu/ft² - yr)
Standard Design	178.38	178.38	13.96
Proposed Design	136.96	136.96	9.05
Compliance Margins	**41.42**	**41.42**	**4.91**
	Pass	**Pass**	**Pass**

[1] Efficiency measures include improvements like a better building envelope and more efficient equipment
[2] Compliance Totals include efficiency, photovoltaics and batteries
[3] Building complies when efficiency and total compliance margins are greater than or equal to zero and unmet load hour limits are not exceeded

C2. TDV ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS (Annual TDV Energy Use, kBtu/ft² - yr)

	COMPLIES[2]		
Energy Component	Standard Design (TDV)	Proposed Design (TDV)	Compliance Margin (TDV)[1]
Space Heating	3.93	4.75	-0.82
Space Cooling	56.61	73.44	-16.83
Indoor Fans	75.96	16.89	59.07
Heat Rejection	0	0	0
Pumps & Misc.	0	0	0
Domestic Hot Water	10.02	10.02	0
Indoor Lighting	31.86	31.86	0
Flexibility	---	---	---
EFFICIENCY COMPLIANCE TOTAL	**178.38**	**136.96**	**41.42 (23.2%)**
Photovoltaics	---	---	---
Batteries	---	---	---
TOTAL COMPLIANCE	**178.38**	**136.96**	**41.42 (23.2%)**

[1] Notes: This number in parenthesis following the Compliance Margin in column 4, represents the Percent Better than Standard.

C3. TDV ENERGY RESULTS FOR NON-REGULATED COMPONENTS[1]

Non-Regulated Energy Component	Standard Design (TDV)	Proposed Design (TDV)	Compliance Margin (TDV)[1]
Receptacle	66.59	66.59	---
Process	---	---	---
Other Ltg	---	---	---
Process Motors	---	---	---
TOTAL (TOTAL COMPLIANCE + NON-REGULATED COMPONENTS)	**244.97**	**203.55**	**41.42 (16.9%)**

[1] Notes: This table is not used for Energy Code Compliance.

C4. SOURCE ENERGY COMPLIANCE RESULTS FOR PERFORMANCE COMPONENTS (Annual SOURCE Energy Use, kBtu/ft² -yr)

	COMPLIES[2]		
Energy Component	Standard Design (SOURCE)	Proposed Design (SOURCE)	Compliance Margin (SOURCE)[1]
Space Heating	0.58	0.67	-0.11
Space Cooling	2.19	2.74	-0.55
Indoor Fans	7.04	1.47	5.57
Heat Rejection	0	0	0
Pumps & Misc.	0	0	0
Domestic Hot Water	1.78	1.78	0
Indoor Lighting	2.39	2.39	0
Flexibility	---	---	---
EFFICIENCY COMPLIANCE TOTAL	**13.96**	**9.05**	**4.91 (35.2%)**
Photovoltaics	---	---	---
Batteries	---	---	---
TOTAL COMPLIANCE	**13.96**	**9.05**	**4.91 (35.2%)**

[1] Notes: This number in parenthesis following the Compliance Margin in column 4, represents the Percent Better than Standard.

C5. SOURCE ENERGY RESULTS FOR NON-REGULATED COMPONENTS[1]

Non-Regulated Energy Component	Standard Design (SOURCE)	Proposed Design (SOURCE)	Compliance Margin (SOURCE)[1]
Receptacle	4.63	4.63	---
Process	---	---	---
Other Ltg	---	---	---
Process Motors	---	---	---
TOTAL (TOTAL COMPLIANCE + NON-REGULATED COMPONENTS)	**18.59**	**13.68**	**4.91 (26.4%)**

[1] Notes: This table is not used for Energy Code Compliance.

C6. 'ABOVE CODE' QUALIFICATIONS

☐ This project is pursuing CalGreen Tier 1 ☐ This project is pursuing CalGreen Tier 2

C7. ENERGY USE SUMMARY

Energy Component	Standard Design Site (MWh)	Proposed Design Site (MWh)	Margin (MWh)	Standard Design Site (MBtu)	Proposed Design Site (MBtu)	Margin (MBtu)
Space Heating	1.6	2	-0.4	---	---	---
Space Cooling	23.5	29.8	-6.3	---	---	---
Indoor Fans	37.8	7.9	29.9	---	---	---
Heat Rejection	---	---	---	---	---	---
Pumps & Misc.	---	---	---	---	---	---
Domestic Hot Water	3.6	3.6	0	19.5	19.5	0
Indoor Lighting	17.6	17.6	0	---	---	---
Flexibility	---	---	---	---	---	---
EFFICIENCY TOTAL	**84.1**	**60.9**	**23.2**	**19.5**	**19.5**	**0**
Photovoltaics	---	---	---	---	---	---
Batteries	---	---	---	---	---	---
ENERGY USE SUBTOTAL	**84.1**	**60.9**	**23.2**	**19.5**	**19.5**	**0**
Receptacle	37.4	37.4	0	---	---	---
Process	---	---	---	---	---	---
Other Ltg	---	---	---	---	---	---
Process Motors	---	---	---	---	---	---
ENERGY USE TOTAL	**121.5**	**98.3**	**23.2**	**19.5**	**19.5**	**0**

C8. ENERGY USE INTENSITY (EUI)

	Standard Design (kBtu/ft² / yr)	Proposed Design (kBtu/ft² / yr)	Margin (kBtu/ft² / yr)	Margin Percentage
GROSS EUI[1]	30.48	24.92	5.56	18.24
NET EUI[2]	30.48	24.92	5.56	18.24

[1] Notes: Gross EUI is Energy Use Total (not including PV)/Total Building Area. Net EUI is Energy Use Total (including PV)/Total Building Area.

D1. EXCEPTIONAL CONDITIONS

• The project uses the Simplified Geometry Performance Modeling Approach which is not capable of modeling daylighting controls and assumes the prescriptive Secondary Daylit Control requirements are met. PRESCRIPTIVE COMPLIANCE documentation (form NRCC-LTI-02-E) for the requirements of section 140.6(d) Automatic Daylighting Controls in Secondary Daylit Zones is required.
• The building does not include service water heating. Verify that service water heating is not required and is not included in the design.

G1. ENVELOPE GENERAL INFORMATION (conditioned spaces only)

01	02	03	04
Opaque Surfaces & Orientation	Total Gross Surface Area (ft^2)	Total Fenestration Area (ft^2)	Window to Wall Ratio (%)
North-Facing[1]	2590	780	30.12
East-Facing[2]	720	0	0
South-Facing[3]	2790	710	25.45
West-Facing[4]	1255	0	0
Total	**7355**	**1490**	**20.26**
Roof	14240	0	0

Notes
[1]North-Facing is oriented to within 45 degrees of true north, including 45 00'00" east of north (NE), but excluding 45 00'00" west of north (NW),
[2]East-Facing is oriented to within 45 degrees of true east, including 45 00'00" south of east (SE), but excluding 45 00'00" north of east (NE),
[3]South-Facing is oriented to within 45 degrees of true south, including 45 00'00" west of south (SW), but excluding 45 00'00" east of south (SE),
[4]West-Facing is oriented to within 45 degrees of true west, including 45 00'00" north of west (NW), but excluding 45 00'00" south of west (SW),

G4. NONRESIDENTIAL AIR BARRIER

01	02
Building Story Name	Air Barrier
Corn-Floor 1	No air barrier

G5. OPAQUE SURFACE ASSEMBLY SUMMARY

01	02	03	04	05	06		07	08	09	10
Surface Name	Construction Type	Area (ft^2)	Framing Type	Cavity R-Value	Continuous R-Value		Units	Value	Description of Assembly Layers	Status[1]
					Interior	Exterior				
R-19 Wall6	Exterior Wall SEE DETAILS A,B,D,E ON G3-05	2,380	Wood	19	N/A	N/A	U-factor	0.0723	Stucco - 7/8 in. Vapor permeable felt - 1/8 in. Composite-1 Gypsum Board - 1/2 in.	N
6 Concrete Wall w/R-1310	Exterior Wall SEE DETAILS A,B,D,E ON G3-05	3,715	Wood	13	N/A	N/A	U-factor	0.0975	Concrete - 140 lb/ft3 - 6 in. Composite-2 Gypsum Board - 5/8 in.	E
R-30 Roof No Attic12	Roof SEE DETAILS J1 & J2 ON A9-40	14,240	Wood	30	N/A	N/A	U-factor	0.034	AsphaltShingles0_25in Vapor permeable felt - 1/8 in. Plywood - 1/2 in. Air - Cavity - Wall Roof Ceiling - 4 in. or more Composite-3 Gypsum Board - 1/2 in.	A
Slab On Grade14	Underground Floor	14,240	N/A	0	N/A	N/A	F-factor	0.73	Slab Type =Unheated slab on grade Insulation Orientation =None Insulation R-Value =none	N
R-13 Wall16	Interior Wall	1,100	Wood	13	N/A	N/A	U-factor	0.0952	Stucco - 7/8 in. Vapor permeable felt - 1/8 in. Composite-4 Gypsum Board - 1/2 in.	N
Existing R-19 Wall64	Exterior Wall	1,260	Wood	19	N/A	N/A	U-factor	0.0723	Stucco - 7/8 in. Vapor permeable felt - 1/8 in. Composite-5 Gypsum Board - 1/2 in.	E

[1] Status: N - New, A - Altered, E - Existing

G5. OPAQUE SURFACE ASSEMBLY SUMMARY

01	02	03	04	05	06		07	08	09	10
Surface Name	Construction Type	Area (ft^2)	Framing Type	Cavity R-Value	Continuous R-Value		Units	Value	Description of Assembly Layers	Status[1]
					Interior	Exterior				
R-21 Wall90	Interior Wall	1,000	Wood	21	N/A	N/A	U-factor	0.0659	Stucco - 7/8 in. Vapor permeable felt - 1/8 in. Composite-6 Gypsum Board - 1/2 in.	N

[1] Status: N - New, A - Altered, E - Existing

G6A. OPAQUE DOOR SUMMARY (NONRESIDENTIAL)

01	02	03	04
Assembly Name	Area (ft^2)	Overall U-factor	Status[1]
Insulated Door8	273	0.2	N

[1] Status: N - New, A - Altered, E - Existing

G7A. FENESTRATION ASSEMBLY SUMMARY (NONRESIDENTIAL)

01	02	03	04	05	06	07	08	09
Fenestration Assembly Name	Fenestration Type/ Product Type / Frame Type	Certification Method[1]	Assembly Method	Area (ft^2)	Overall U-factor	Overall SHGC	Overall VT	Status[2]
Double Non Metal Clear	Vertical fenestration Fixed window Non-metal	Default 110.6	Site built	1,490	0.55	0.67	0.77	N

[1] Notes: Newly installed fenestration shall have a certified NFRC Label Certificate or use the CEC default tables found in Table 110.6-A and Table 110.6-B. Center of Glass (COG) values are for the glass-only, determined by the manufacturer, and are shown for ease of verification. Site-built fenestration values are calculated per Nonresidential Appendix NA6 and are used in the analysis.
[2] Status: N - New, A - Altered, E - Existing

H1. DRY SYSTEM EQUIPMENT (FURNACES, AIR HANDLING UNITS, HEAT PUMPS, VRF, ECONOMIZERS ETC.)

01	02	03	04	05	06	07	08	09	10	11	12
			Heating				Cooling				
Equipment Name	Equipment Type	Qty	Total Heating Output (kBtu/h)	Supp Heat Output (kBtu/h)	Efficiency Unit	Efficiency	Total Cooling Output (kBtu/h)	Efficiency Unit	Efficiency	Economizer Type (if present)	Status[1]
HP-1A	Package SZ VAV Heat Pump Air System	1	35.5	0	N/A	NA	38.28	EER SEER	12.1 14.3	Fixed DB	N
HP-1B	Package SZ VAV Heat Pump Air System	1	35.5	0	N/A	NA	38.28	EER SEER	12.1 14.3	Fixed DB	N
HP-3D	Package SZ VAV Heat Pump Air System	1	85.28	0	COP	3.4	90.04	EER	11	Fixed DB	N
HP-3A 3C	Package SZ VAV Heat Pump Air System	1	85.28	0	COP	3.4	90.04	EER	11	Fixed DB	N
HP-3B	Package SZ VAV Heat Pump Air System	1	85.28	0	COP	3.4	90.04	EER	11	Fixed DB	N
HP-2A 2B 2C	Package SZ VAV Heat Pump Air System	3	73.68	0	COP	3.4	76.96	EER	12.1	Fixed DB	N
HP-4	Package SZ VAV Heat Pump Air System	1	35.5	0	N/A	NA	38.28	EER SEER	12.1 14.3	Fixed DB	N
FC-1 CU-1	Single Zone Air Conditioner [SZAC] Air System	1	0	0	N/A	NA	18	EER SEER	10.7 19.8	No Economizer	N

[1] Status: N - New, A - Altered, E - Existing

H3. NONRESIDENTIAL / COMMON USE AREA FAN SYSTEMS SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12	13
Name or Item Tag	Qty	Design OA CFM	Supply Fan				Return / Relief Fan					Status[1]
			CFM	Power	Power Units	Control	Fan Type	CFM	Power	Power Units	Control	
HP-1A	1	183	1,200	0.41	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
HP-1B	1	153.75	1,200	0.41	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
HP-3D	1	326.25	3,000	1.42	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
HP-3A 3C	1	450	3,000	1.42	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
HP-3B	1	225	2,500	1.42	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
HP-2A 2B 2C	3	575.83	2,250	0.67	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
HP-4	1	269.25	1,200	0.41	BHP	VSD	N/A	N/A	N/A	N/A	N/A	N
FC-1 CU-1	1	0	400	0.03	BHP	Constant Vol	N/A	N/A	N/A	N/A	N/A	N

[1] Status: N - New, A - Altered, E - Existing

H8. SYSTEM SPECIAL FEATURES

01	02	03	04
System Name	Equipment Type	Interlocks per 140.4(o)[1]	Other Special Features and Controls
HP-1A	Package SZ VAV Heat Pump Air System	N/A	Fixed DB
HP-1B	Package SZ VAV Heat Pump Air System	N/A	Fixed DB
HP-3D	Package SZ VAV Heat Pump Air System	N/A	Fixed DB
HP-3A 3C	Package SZ VAV Heat Pump Air System	N/A	Fixed DB
HP-3B	Package SZ VAV Heat Pump Air System	N/A	Fixed DB
HP-2A 2B 2C	Package SZ VAV Heat Pump Air System	N/A	Zone(s) With CO2 Sensor Vent. Control Fixed DB
HP-4	Package SZ VAV Heat Pump Air System	N/A	Fixed DB

Notes: This table includes controls related to the performance path only. For projects using the prescriptive path, mandatory and prescriptive controls requirements are documented on the NRCC-MCH-E.
[1] Yes = interlocks are provided, No = interlocks are not provided, NA means no operable openings.

H9. NONRESIDENTIAL / COMMON USE AREA & HOTEL/MOTEL VENTILATION

01	02	03	04		05	06	07
Zone Name		Mechanical Ventilation				Conditioned Area (sf)	DCV or Occupant Sensor Controls, or Both
	Ventilation Function	# of People	Supply OA CFM		Exhaust CFM		
1-HP-1A	Office - Office space	6.1	183		0	1220	N/A
2-HP-1B	Office - Office space	5.13	153.75		0	1025	N/A
3-HP-3D	Misc - All others	10.88	326.25		0	2175	N/A
4-HP-3A 3C	Sports/Entertainment - Health club/aerobics room	30	450		0	3000	N/A
5-HP-3B	Sports/Entertainment - Health club/aerobics room	15	225		0	1500	N/A
6-HP-2A 2B 2C	Lodging - Multipurpose assembly	115.17	1727.5		0	3455	DCV
7-HP-4	Misc - All others	8.97	269.25		0	1795	N/A
8-Undefined Zone	General - Unoccupied	0.35	0		0	70	N/A

H11. ZONAL SYSTEM AND TERMINAL UNIT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12
System ID	System Type	Qty	Rated Capacity (kBtuh)		Airflow (cfm)			Fan			VSD
			Heating	Cooling	Design	Min.	Min. Ratio	Power	Power Units	Cycles	
1-HP-1A-Trm	Variable Air Volume No Reheat Box	1	N/A	N/A	1,200	500	0.42	N/A	N/A	N/A	☐
2-HP-1B-Trm	Variable Air Volume No Reheat Box	1	N/A	N/A	1,200	500	0.42	N/A	N/A	N/A	☐
3-HP-3D-Trm	Variable Air Volume No Reheat Box	1	N/A	N/A	3,000	700	0.23	N/A	N/A	N/A	☐

H11. ZONAL SYSTEM AND TERMINAL UNIT SUMMARY

01	02	03	04	05	06	07	08	09	10	11	12
System ID	System Type	Qty	Rated Capacity (kBtuh)		Airflow (cfm)			Fan			VSD
			Heating	Cooling	Design	Min.	Min. Ratio	Power	Power Units	Cycles	
4-HP-3A 3C-Trm	Variable Air Volume No Reheat Box	1	N/A	N/A	3,000	700	0.23	N/A	N/A	N/A	☐
5-HP-3B-Trm	Variable Air Volume No Reheat Box	1	N/A	N/A	2,500	700	0.28	N/A	N/A	N/A	☐
6-HP-2A 2B 2C-Trm	Variable Air Volume No Reheat Box	3	N/A	N/A	6,750	1,800	0.27	N/A	N/A	N/A	☐
7-HP-4-Trm	Variable Air Volume No Reheat Box	1	N/A	N/A	1,200	500	0.42	N/A	N/A	N/A	☐
8-Undefined Zone-Trm	Uncontrolled	1	N/A	N/A	400	N/A	0	N/A	N/A	N/A	☐

K1. INDOOR CONDITIONED LIGHTING GENERAL INFO

01	02	03	04	05	06
Occupancy Type[1]	Conditioned Floor Area[2] (ft^2)	Installed Lighting Power (Watts)	Lighting Control Credits (Watts)	Additional (Custom) Allowance	
				Area Category Footnotes (Watts)	Area Category Footnotes (Watts)
All Other Space Types	4040	1616	0	0	0
Convention, Conference, Multipurpose and Meeting Center	3455	2591.25	0	0	0
Exercise Center Gymnasium	4500	2250	0	0	0
Office (250 square feet)	2245	1347	0	0	0
Building Totals:	**14240**	**7804.25**	**0**	**0**	**0**

[1]See NRCC-LTI-E for unconditioned spaces
[2]Lighting information for existing spaces modeled is not included in this table

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CLIENT

PocockDesignSolutions Inc.

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 05.21.25

REVISIONS

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

TITLE 24 COMPLIANCE FORMS

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CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD	NRCC-PRF-E
Nonresidential Performance Compliance Method	(Page 17 of 19)

K4. INDOOR CONDITIONED LIGHTING MANDATORY LIGHTING CONTROL

See NRCC-LTI-E for mandatory controls

L. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections made by Documentation Author indicate which Certificates of Installation must be submitted for the features to be recognized for compliance. These documents must be retained and provided to the building inspector during construction and can be found online

Building Component	Form/Title
Envelope	NRCI-ENV-01-E - Must be submitted for all buildings
Envelope	NRCI-ENV-E - Envelope (for all buildings)
Mechanical	NRCI-MCH-01-E - Must be submitted for all buildings
Mechanical	NRCI-MCH-E - For all buildings with Mechanical Systems
Indoor Lighting	NRCI-LTI-E - Indoor Lighting (for all buildings)

M. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections made by Documentation Author indicate which Certificates of Acceptance must be submitted for the features to be recognized for compliance. These documents must be provided to the building inspector during construction and must be completed through an Acceptance Test Technician Certification Provider (ATTCP).

Building Component	Form/Title
Envelope	NRCA-ENV-02-F - NRFC label verification for fenestration
Mechanical	NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap
Mechanical	NRCA-MCH-03-A - Constant Volume Single Zone HVAC
Mechanical	NRCA-MCH-05-A - Air Economizer Controls
Mechanical	NRCA-MCH-06-A Demand Control Ventilation Systems must be submitted for all systems required to employ demand controlled ventilation (refer to) can vary outside ventilation flow rates based on maintaining interior carbon dioxide (CO2) concentration setpoints.
Mechanical	NRCA-MCH-07-A Supply Fan Variable Flow Controls
Mechanical	NRCA-MCH-12-A FDD for Packaged Direct Expansion Units
MECHANICAL	NRCA-MCH-19 - OCCUPANCY SENSOR CONTROLS

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD	NRCC-PRF-E
Nonresidential Performance Compliance Method	(Page 18 of 19)

N. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

Selections made by Documentation Author indicate which Certificates of Verification must be submitted for the features to be recognized for compliance. These documents must be retained and provided to the building inspector during construction and can be found online

There are no Certificates of Verification applicable to this project

CERTIFICATE OF COMPLIANCE - NONRESIDENTIAL PERFORMANCE COMPLIANCE METHOD	NRCC-PRF-E
Nonresidential Performance Compliance Method	(Page 19 of 19)

Documentation Author's Declaration Statement

1. I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Andrew Gossman	Documentation Author Signature: Andrew Gossman
Company:	Signature Date:
Address: 14451 Chambers Road, Suite 210	CEA/HERS Certification Identification (if applicable): M35839
City/State/Zip: Tustin, CA 92780	Phone: 949-4173903

Responsible Person's Declaration statement

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I understand that a registered copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections, and I will take the necessary steps to accomplish this requirement.
6. I understand that a registered copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy, and I will take the necessary steps to accomplish these requirements.

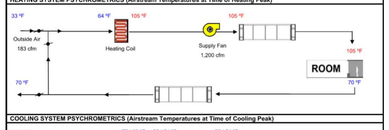
Responsible Designer Name: Andrew Gossman	Responsible Designer Signature: Andrew Gossman
Company: Pocock Design Solutions	
Address: 14451 Chambers Road, Suite 210	Date Signed:
City/State/Zip: Tustin, CA 92780	License #: M39839
Phone: 949-417-3903	Title: Scope:

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

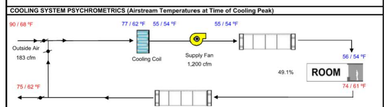
Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-1A | Floor Area: 1,220

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	1,020	20,035	2,440	169	6,343
Output per System	35,500	Total Vented Lighting		0			0
Total Output (Btuh)	35,500	Return Air Ducts		1,002			317
Output (Btuh/sqft)	29.1	Return Fan		0			0
Cooling System		Ventilation	183	3,004	554	183	7,252
Output per System	38,280	Supply Fan		0			0
Total Output (Btuh)	38,280	Supply Air Ducts		1,002			317
Total Output (Tons)	3.2	TOTAL SYSTEM LOAD		25,043	2,994		14,230
Total Output (Btuh/sqft)	31.4						
Total Output (sqft/Ton)	382.4						
Air System							
CFM per System	1,200	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	1,200	Trane WSC036		31,220	5,294		26,522
Airflow (cfm/sqft)	0.98						
Airflow (cfm/Ton)	376.2						
Outside Air (%)	15.3%	Total Adjusted System Output (Adjusted for Peak Design conditions)		31,220	5,294		26,522
Outside Air (cfm/sqft)	0.15						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Jul 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-1B | Floor Area: 1,025

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	1,025	20,135	2,050	141	5,283
Output per System	35,500	Total Vented Lighting		0			0
Total Output (Btuh)	35,500	Return Air Ducts		1,007			264
Output (Btuh/sqft)	34.6	Return Fan		0			0
Cooling System		Ventilation	154	2,082	-6	154	6,100
Output per System	38,280	Supply Fan		0			0
Total Output (Btuh)	38,280	Supply Air Ducts		1,007			264
Total Output (Tons)	3.2	TOTAL SYSTEM LOAD		24,234	2,044		11,911
Total Output (Btuh/sqft)	37.3						
Total Output (sqft/Ton)	321.3						
Air System							
CFM per System	1,200	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	1,200	Trane WSC036		31,211	5,529		26,522
Airflow (cfm/sqft)	1.17						
Airflow (cfm/Ton)	376.2						
Outside Air (%)	12.8%	Total Adjusted System Output (Adjusted for Peak Design conditions)		31,211	5,529		26,522
Outside Air (cfm/sqft)	0.15						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Sep 2 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)

COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-3D | Floor Area: 2,175

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	1,905	38,780	4,360	230	8,649
Output per System	85,280	Total Vented Lighting		0			0
Total Output (Btuh)	85,280	Return Air Ducts		1,939			432
Output (Btuh/sqft)	39.2	Return Fan		0			0
Cooling System		Ventilation	1,475	20,262	1,422	1,475	58,631
Output per System	90,040	Supply Fan		0			0
Total Output (Btuh)	90,040	Supply Air Ducts		1,939			432
Total Output (Tons)	7.5	TOTAL SYSTEM LOAD		62,926	5,772		68,143
Total Output (Btuh/sqft)	41.4						
Total Output (sqft/Ton)	289.9						
Air System							
CFM per System	3,000	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	3,000	Trane WSC092		65,323	2,776		63,713
Airflow (cfm/sqft)	1.38						
Airflow (cfm/Ton)	399.6						
Outside Air (%)	49.2%	Total Adjusted System Output (Adjusted for Peak Design conditions)		65,323	2,776		63,713
Outside Air (cfm/sqft)	0.68						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Sep 2 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)

COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-3A 3C | Floor Area: 3,000

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	2,726	63,668	52,500	612	22,855
Output per System	85,280	Total Vented Lighting		0			0
Total Output (Btuh)	85,280	Return Air Ducts		2,683			1,143
Output (Btuh/sqft)	28.4	Return Fan		0			0
Cooling System		Ventilation	450	7,361	-6,245	450	17,781
Output per System	90,040	Supply Fan		0			0
Total Output (Btuh)	90,040	Supply Air Ducts		2,683			1,143
Total Output (Tons)	7.5	TOTAL SYSTEM LOAD		66,396	46,255		42,921
Total Output (Btuh/sqft)	30.0						
Total Output (sqft/Ton)	399.8						
Air System							
CFM per System	3,000	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	3,000	Trane WSC092		62,550	29,381		63,713
Airflow (cfm/sqft)	1.00						
Airflow (cfm/Ton)	399.8						
Outside Air (%)	15.0%	Total Adjusted System Output (Adjusted for Peak Design conditions)		62,550	29,381		63,713
Outside Air (cfm/sqft)	0.15						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Jul 3 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)

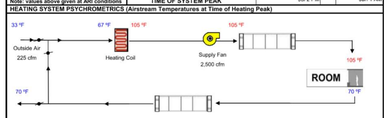
COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

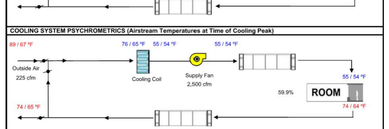
Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-3B | Floor Area: 1,500

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	813	16,396	26,250	51	1,918
Output per System	85,280	Total Vented Lighting		0			0
Total Output (Btuh)	85,280	Return Air Ducts		820			96
Output (Btuh/sqft)	56.9	Return Fan		0			0
Cooling System		Ventilation	225	3,648	-1,458	225	8,967
Output per System	90,040	Supply Fan		0			0
Total Output (Btuh)	90,040	Supply Air Ducts		820			96
Total Output (Tons)	7.5	TOTAL SYSTEM LOAD		21,682	24,792		11,077
Total Output (Btuh/sqft)	60.0						
Total Output (sqft/Ton)	199.9						
Air System							
CFM per System	2,500	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	2,500	Trane WSC092(1)		67,465	21,666		63,713
Airflow (cfm/sqft)	1.67						
Airflow (cfm/Ton)	333.2						
Outside Air (%)	9.0%	Total Adjusted System Output (Adjusted for Peak Design conditions)		67,465	21,666		63,713
Outside Air (cfm/sqft)	0.15						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Jul 2 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)



COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)



HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-2A 2B 2C | Floor Area: 3,455

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	6,848	133,521	35,702	416	15,636
Output per System	73,680	Total Vented Lighting		0			0
Total Output (Btuh)	221,040	Return Air Ducts		6,675			782
Output (Btuh/sqft)	64.0	Return Fan		0			0
Cooling System		Ventilation	1,728	19,413	-11,796	1,728	68,717
Output per System	76,960	Supply Fan		0			0
Total Output (Btuh)	230,880	Supply Air Ducts		6,675			782
Total Output (Tons)	19.2	TOTAL SYSTEM LOAD		166,287	23,906		85,916
Total Output (Btuh/sqft)	66.8						
Total Output (sqft/Ton)	179.6						
Air System							
CFM per System	2,250	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	6,750	Trane WSC074		196,968	30,178		165,140
Airflow (cfm/sqft)	1.95						
Airflow (cfm/Ton)	350.8						
Outside Air (%)	25.6%	Total Adjusted System Output (Adjusted for Peak Design conditions)		196,968	30,178		165,140
Outside Air (cfm/sqft)	0.50						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Oct 2 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)

COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)

HVAC SYSTEM HEATING AND COOLING LOADS SUMMARY

Project Name: Palms Community Center | Date: 7/26/2024
System Name: HP-4 | Floor Area: 1,795

ENGINEERING CHECKS		SYSTEM LOAD	COIL COOLING PEAK CFM	COIL COOLING PEAK Sensible	COIL COOLING PEAK Latent	COIL HTG. PEAK CFM	COIL HTG. PEAK Sensible
Number of Systems	1						
Heating System		Total Room Loads	1,225	23,881	3,590	233	8,705
Output per System	35,500	Total Vented Lighting		0			0
Total Output (Btuh)	35,500	Return Air Ducts		1,194			435
Output (Btuh/sqft)	19.8	Return Fan		0			0
Cooling System		Ventilation	269	4,185	584	269	10,644
Output per System	38,280	Supply Fan		0			0
Total Output (Btuh)	38,280	Supply Air Ducts		1,194			435
Total Output (Tons)	3.2	TOTAL SYSTEM LOAD		30,454	4,174		20,223
Total Output (Btuh/sqft)	21.3						
Total Output (sqft/Ton)	562.7						
Air System							
CFM per System	1,200	HVAC EQUIPMENT SELECTION					
Airflow (cfm)	1,200	Trane WSC036		31,689	5,301		26,522
Airflow (cfm/sqft)	0.67						
Airflow (cfm/Ton)	376.2						
Outside Air (%)	22.4%	Total Adjusted System Output (Adjusted for Peak Design conditions)		31,689	5,301		26,522
Outside Air (cfm/sqft)	0.15						
Note: values above given at ARI conditions		TIME OF SYSTEM PEAK		Jul 2 PM			Jan 1 AM

HEATING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Heating Peak)

COOLING SYSTEM PSYCHROMETRICS (Airstream Temperatures at Time of Cooling Peak)

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TITLE 24 COMPLIANCE FORMS

SHEET

M3.4

FIXTURE SCHEDULE

ITEM	FIXTURE	ROUGH-IN CONNECTIONS: TRAP	WASTE	VENT	HOT WATER	COLD WATER	GAS	DESCRIPTION
WC 1	WATER CLOSET (BAT. I/R SENSOR)	INT	4"	2"	--	1"	--	AMERICAN STANDARD (A/S) NO. 3351.101 "AFWALL MILLENIUM FLOWISE ELONGATED FLUSHOMETER TOILET", SIPHON JET, WALL HUNG, ELONGATED BOWL, TOP SPUD. COMPLETE WITH SLOAN ECOS NO. 8111-1.28 GPF BATTERY POWERED SENSOR OPERATED FLUSH VALVE, OLSONITE NO. 95SSCT SEAT AND ZURN NO. Z1201 & Z1202 SERIES CARRIER.
WC 2	WATER CLOSET (ACCESSIBLE, BAT. I/R SENSOR)	INT	4"	2"	--	1"	--	AMERICAN STANDARD (A/S) NO. 3351.101 "AFWALL MILLENIUM FLOWISE ELONGATED FLUSHOMETER TOILET", SIPHON JET, WALL HUNG, ELONGATED BOWL, TOP SPUD. COMPLETE WITH SLOAN ECOS NO. 8111-1.28 GPF BATTERY POWERED SENSOR OPERATED FLUSH VALVE, OLSONITE NO. 95SSCT SEAT AND ZURN NO. Z1201 & Z1202 SERIES CARRIER, MOUNT AT ADA ACCESSIBLE HEIGHT.
WC 3	WATER CLOSET (ACCESSIBLE, BAT. I/R SENSOR)	INT	4"	2"	--	1"	--	AMERICAN STANDARD (A/S) NO. 3461.160 "MADERA FLOWISE 16-1/2" HEIGHT ELONGATED FLUSHOMETER TOILET", SIPHON JET, FLOOR MOUNTED, ELONGATED BOWL, 16-1/2" HIGH. COMPLETE WITH SLOAN ECOS NO. 8111-1.28 GPF BATTERY POWERED SENSOR OPERATED FLUSH VALVE, OLSONITE NO. 95SSCT SEAT AND A/S BOLT CAPS.
UR 1	URINAL (BAT. I/R SENSOR)	INT	2"	1-1/2"	--	3/4"	--	AMERICAN STANDARD (A/S) NO. 6002.001 "PINTBROOK URINAL", WALL HUNG, SIPHON JET. COMPLETE WITH SLOAN ECOS NO. 8186-0.125 GPF BATTERY POWERED FLUSH VALVE, AND ZURN NO. Z-1222 WALL HANGER.
UR 2	URINAL (ACCESSIBLE, BAT. I/R SENSOR)	INT	2"	1-1/2"	--	3/4"	--	AMERICAN STANDARD (A/S) NO. 6002.001 "PINTBROOK URINAL", WALL HUNG, SIPHON JET. COMPLETE WITH SLOAN ECOS NO. 8186-0.125 GPF BATTERY POWERED FLUSH VALVE AND ZURN NO. Z-1222 WALL HANGER, MOUNT AT ADA ACCESSIBLE HEIGHT.
L 1	LAVATORY (ACCESSIBLE, TW, BAT. I/R SENSOR)	1-1/4"	2"	1-1/2"	1/2" TW	1/2"	--	AMERICAN STANDARD (A/S) NO. 0355.012 "LUCERNE WALL HUNG LAVATORY", 20" X 18", WALL HUNG. COMPLETE WITH CHICAGO NO. 116.201.AB.1 BATTERY POWERED ELECTRONIC FAUCET WITH E2805-5AB 0.5 GPM NON-AERATING SPRAY, 240.627.21.1 COVER PLATE, McGUIRE NO. 155A 1-1/4" OUTLET "OPEN GRID P.O. PLUG", McGUIRE NO. PW809ONCO 1-1/4" L.A. PATTERN P-TRAP WITH TRAP AND SUPPLY COVERS, GALVANIZED NIPPLE AND CHROMIUM PLATED BRASS CASING, CHICAGO NO. 1017-ABCP LOOSE KEY STOPS WITH RIGID SUPPLIES, AND ZURN NO. Z-1231 ADJUSTABLE CONCEALED ARM CARRIER W/ SLEEVE FOR WASTE. MOUNT IN ACCORDANCE WITH ADA REQUIREMENTS.
L 2	LAVATORY (ACCESSIBLE, SELF RIMMING, TW)	1-1/4"	2"	1-1/2"	1/2" TW	1/2"	--	AMERICAN STANDARD (A/S) NO. 0476.028 "AQUALYN COUNTERTOP LAVATORY", 20" X 17", SELF RIMMING, FAUCET LEDGE, VITREOUS CHINA. COMPLETE WITH CHICAGO NO. 116.201.AB.1 BATTERY POWERED ELECTRONIC FAUCET WITH E2805-5AB 0.5 GPM NON-AERATING SPRAY, 240.627.21.1 COVER PLATE, McGUIRE NO. 155A 1-1/4" OUTLET "OPEN GRID P.O. PLUG", McGUIRE NO. PW809ONCO 1-1/4" L.A. PATTERN P-TRAP WITH TRAP AND SUPPLY COVERS, GALVANIZED NIPPLE AND CHROMIUM PLATED BRASS CASING, AND CHICAGO NO. 1017-ABCP LOOSE KEY STOPS WITH RIGID SUPPLIES. MOUNT IN ACCORDANCE WITH ADA REQUIREMENTS.
SS 1	SERVICE SINK	3"	3"	2"	3/4"	3/4"	--	CECO NO. 871 "CORNER SERVICE SINK", ENAMELED CAST IRON, CORNER FLOOR MOUNTED, COMPLETE WITH CHICAGO NO. 445-PVB-CP FAUCET, CECO NO. B71-3" 3" DIAMETER DRAIN WITH FLAT CHROME STRAINER, CECO NO. B-872 COATED WIRE RIM GUARD AND HOSE.
TP 1	TRAP PRIMER (SINGLE DRAIN)	--	--	--	--	1/2"	--	MIFAB NO. MR-500 TRAP PRIMER VALVE, BRASS BODY, ADJUSTABLE, COMPLETE WITH 1/2" COPPER TYPE "L" PIPE TO RECEPTOR, INSTALL PER MANUFACTURER'S RECOMMENDATIONS, COMPLETE BEHIND ACCESS PANEL WITH SHUT-OFF VALVE.
TP 2	TRAP PRIMER (MULTIPLE DRAIN)	--	--	--	--	1/2"	--	MIFAB NO. MR-500 TRAP PRIMER VALVE, BRASS BODY, ADJUSTABLE, COMPLETE WITH MI-DU DISTRIBUTION UNIT, 1/2" COPPER TYPE "L" PIPE TO EACH RECEPTOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS, COMPLETE BEHIND ACCESS PANEL WITH SHUT-OFF VALVE.
TP 3	TRAP PRIMER (ELECTRONIC)	--	--	--	--	1/2"	--	PPP NO. MP-500-115V MINI-PRIME ELECTRONIC TRAP SEAL PRIMER SYSTEM WITH BALL VALVE, VACUUM BREAKER AND SOLENOID VALVE (120 VOLT, 1 PHASE). COMPLETE WITH SHUT-OFF VALVE AND 1/2" COPPER TYPE "L" PIPE TO RECEPTOR.

ITEM	FIXTURE	ROUGH-IN CONNECTIONS: TRAP	WASTE	VENT	HOT WATER	COLD WATER	GAS	DESCRIPTION
WHA 1	WATER HAMMER ARRESTOR							ZURN NO. Z-1700 SERIES "SHOKTROL" WATER HAMMER ARRESTOR COMPLETE BEHIND ACCESS PANEL. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
FD 1	FLOOR DRAIN	2"	2"	1-1/2"	--	--	--	ZURN NO. ZN-415-BZ1-P, CAST IRON BODY, COMPLETE WITH ROUND NICKEL-BRONZE TOP, CLAMPING COLLAR, 1/2" TRAP PRIMER CONNECTION AND P-TRAP.
RD 1	ROOF DRAIN	SEE PLAN FOR SIZES						ZURN NO. ZC100-DP-84, 15" CAST IRON BODY, COMPLETE WITH ADJUSTABLE EXTENSION SLEEVE, FLASHING COLLAR, STAINLESS STEEL GRAVEL STOP, CAST IRON DOME STRAINER, SUMP RECEIVER, AND UNDERDECK CLAMP.
OD 1	OVERFLOW DRAIN	SEE PLAN FOR SIZES						ZURN NO. ZC100-DP-84-89, 15" CAST IRON BODY, COMPLETE WITH CAST IRON DOME STRAINER, UNDERDECK CLAMP, AND 2" HIGH WATER DAM.
FS 1	FLOOR SINK	2"	2"	1-1/2"	--	--	--	ZURN NO. ZN1901-KC-P-2, 12" X 12" X 8" DEEP, CAST IRON BODY, ACID-RESISTING ENAMELED INTERIOR. COMPLETE WITH DOME STRAINER, NICKEL-BRONZE HALF GRATE, SEEPAGE FLANGE, TRAP PRIMER CONNECTION AND P-TRAP.
FS 2	FLOOR SINK	3"	3"	2"	--	--	--	ZURN NO. ZN1901-KC-P-2, 12" X 12" X 8" DEEP, CAST IRON BODY, ACID-RESISTING ENAMELED INTERIOR. COMPLETE WITH DOME STRAINER, NICKEL-BRONZE HALF GRATE, SEEPAGE FLANGE, TRAP PRIMER CONNECTION AND P-TRAP.
EWC 1	ELECTRIC WATER COOLER W/BOTTLE FILLER (ACCESSIBLE)	1-1/2"	2"	1-1/2"	--	3/4"	--	HAWS NO. H1119.8 WTH 1920 BOTTLE FILLER, DUAL HEIGHT, RECESSED WALL MOUNTED, STAINLESS STEEL, BARRIER FREE, RECESSED COMPRESSOR IN WALL, 8 GPH OF 50° F. WATER WITH 80° F. INLET WATER AT 90° F, AMBIENT, 1/5 HP, 115 VOLT, 1 PHASE. COMPLETE WITH NO. 6700.4 MOUNTING PLATE, B32 BACK PANEL, AND CHICAGO NO. 45LKABCP ANGLE STOP WITH 1/2" FEMALE INLET & OUTLET, AND NO. 6469 DRIP TRAY. MOUNT AT ADA ACCESSIBLE HEIGHT.
DN 1	DOWNSPOUT NOZZLE	SEE PLAN FOR SIZES						ZURN NO. Z199-DC, STAINLESS STEEL FRAME WITH FABRICATED SECURED PERFORATED STAINLESS STEEL HINGED STRAINER, THREADED INLET AND DECORATIVE FACE OF WALL FLANGE AND OUTLET NOZZLE.
ET 1	EXPANSION TANK	--	--	--	--	--	--	WILKINS NO. WXT-8, 2 GALLON, DIAPHRAGM TYPE, PRE-PRESSURIZED, WELDED EXTERIOR, BUTYL DIAPHRAGM AND EPOXY COATED EXTERIOR W/ MAPA MXC-8 EXPANSION TANK CAGE.
ET 2	EXPANSION TANK	--	--	--	--	--	--	WILKINS NO. WXT-18, 4 GALLON, DIAPHRAGM TYPE, PRE-PRESSURIZED WITH WELDED EXTERIOR, BUTYL DIAPHRAGM AND EPOXY COATED EXTERIOR W/ MAPA MXC-11 EXPANSION TANK CAGE.
HB 1	HOSE BIBB (WALL)	--	--	--	--	3/4"	--	ACORN NO. 8121-CP "BENT NOSE WITH FLANGE" HOSE BIBB, WALL MOUNTED, CHROME-PLATED POLISHED, WITH INTEGRAL VACUUM BREAKER, LOOSE KEY OPERATION.
HB 2	HOSE BIBB (FREE STANDING, ROOF)	--	--	--	--	3/4"	--	ACORN NO. 8126-CR "BENT NOSE" HOSE BIBB, FREE STANDING, CHROME-PLATED ROUGH, WITH INTEGRAL VACUUM BREAKER, LOOSE KEY OPERATION. SUPPLY PIPING SHALL BE SECURELY FASTENED TO ROOF DECKING WITH 3/4" NIBCO NO. 724-5-A "HY-SET HANGER COUPLING".
MV 1	MIXING VALVE	--	--	--	1/2"	1/2"	--	SYMMONS NO. 7-225-CK-MS-BTX "MAXLINE", WATER TEMPERATURE LIMITING VALVE. COMPLETE WITH INTEGRAL CHECKS AND DUAL STANLESS STEEL STRAINERS, STAINLESS STEEL RECESSED WALL CABINET, AND SEPARATE CHECK STOPS.
IMB 1	ICE MAKER BOX	--	--	--	--	1/2"	--	GUY GRAY NO. MIB1-HAAB "METAL LEAD FREE ICE MAKER BOX", COMPLETE WITH INTEGRAL HAMMER ARRESTER QUARTER-TURN VALVE, 1/4" O.D. COMPRESSION OUTLET CONNECTION AND WHITE POWDER COAT FINISH. INSTALL ICE MAKER BOX @ 18" ABOVE FINISH FLOOR.

WATER HEATER SCHEDULE

ITEM	MANUFACTURER	MODEL NO.	SERVICE	LOCATION	STORAGE	ELECTRICAL DEMANDS: VOLT	PHASE	KW/AMP	CYCLE	RECOVERY CAPACITY @ 60°F	INLET TEMP °F	OUTLET TEMPER °F	OPER. WT. LBS.	REMARKS
WH 1	AO SMITH	DEL-20	DOMESTIC HOT WATER	SEE PLANS	20 GALLONS	208	1	3.0	60	20 GPH	60	120	240 LBS.	MUST HAVE ASHRAE STICKER OR OTHERWISE COMPLY WITH TITLE 24 REQUIREMENT FOR SERVICE WATER HEATERS,
WH 2	AO SMITH	DRE-80	DOMESTIC HOT WATER	SEE PLANS	80 GALLONS	208	3	15.0	60	102 GPH	60	120	948 LBS.	

GENERAL NOTES

1. BEFORE COMMENCEMENT OF WORK, THE CONTRACTOR SHALL VERIFY THE EXACT LOCATIONS, ELEVATIONS AND CHARACTERISTICS OF ALL UTILITIES AND PIPING, AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.
2. ALL ACCESSIBLE WATER CLOSETS SHALL HAVE FLUSH VALVE WITH HANDLE ON OPEN SIDE.
3. ALL VALVES, UNIONS, ETC. TO BE SAME SIZE AS PIPE UNLESS OTHERWISE INDICATED ON DRAWINGS.
4. ALL PLUMBING FIXTURE VENTS TO TERMINATE A MINIMUM OF 12 INCHES FROM ANY VERTICAL SURFACE AND 10 FEET FROM ANY OUTSIDE AIR INTAKES.
5. EXACT LOCATIONS AND MOUNTING HEIGHTS OF PLUMBING FIXTURES SHALL BE OBTAINED FROM THE ARCHITECTURAL DRAWINGS.
6. ALL EXTERIOR GAS COCKS, WATER SHUT OFF VALVES AND/OR SEWER CLEANOUTS BELOW GROUND SHALL BE INSTALLED IN YARD BOXES WITH THE COVERS CONSPICUOUSLY MARKED "GAS", "WATER", AND "SEWER" RESPECTIVELY.
7. CONNECTION BETWEEN INCOMPATIBLE MATERIALS ABOVE GRADE AND INSIDE BUILDING SHALL BE MADE WITH TWO (2) DIELECTRIC UNIONS SEPARATED BY A TWELVE INCH (12") SECTION OF RED BRASS PIPE.
8. ALL CLEANOUTS SHALL BE INSTALLED WHERE READILY ACCESSIBLE. ALL URNINALS SHALL HAVE CLEANOUTS ABOVE FIXTURE, CPC 707.4. THE CONTRACTOR SHALL COORDINATE ALL CLEANOUT LOCATIONS WITH EQUIPMENT, CABINETS, ETC., AND THE ARCHITECT PRIOR TO ANY INSTALLATION.
9. ALL URINALS SHALL HAVE CLEANOUTS ABOVE FIXTURE, PER CPC 707.4. THE CONTRACTOR SHALL COORDINATE ALL CLEANOUT LOCATIONS WITH THE ARCHITECT PRIOR TO ANY INSTALLATION.
10. SEE ARCHITECTURAL DRAWINGS FOR ACCESSIBLE FIXTURE LOCATIONS AND MOUNTING HEIGHTS. INSULATE ALL EXPOSED HOT WATER AND DRAIN PIPING BELOW ACCESSIBLE LAVATORIES AND SINKS.
11. ALL PLUMBING WORK SHALL BE INSTALLED SO AS TO AVOID INTERFERENCE WITH ELECTRICAL AND MECHANICAL EQUIPMENT AND STRUCTURAL FRAMING.
12. ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH CALIFORNIA PLUMBING CODE 2022.
13. THESE DRAWINGS INDICATE THE SEWER, WATER, AND STORM DRAIN SYSTEMS TO POINT OF CONNECTION 5'-0" OUTSIDE OF THE BUILDING. CONTINUATION OF THESE SYSTEMS IS SHOWN ON THE CIVIL DRAWINGS AND IS SPECIFIED UNDER ANOTHER SECTION OF THE SPECIFICATIONS. THE PIPING SHALL BE INSTALLED TO MEET THE INVERT ELEVATIONS SHOWN ON THE CIVIL DRAWINGS.
14. INSULATION (SEE SPECIFICATION FOR TYPE REQUIRED) AND COVERING ON PIPE AND TUBING SHALL HAVE A FLAME SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DENSITY NOT TO EXCEED 450 WHEN TESTED IN ACCORDANCE WITH 2022 C.B.C. SECTION 720.3.
15. MATERIALS EXPOSED WITHIN DUCTS OR PLENUMS SHALL HAVE A FLAME-SPREAD INDEX OF NOT MORE THAN 25 AND A SMOKE-DEVELOPED INDEX OF NOT MORE THAN 50 WHERE TESTED IN ACCORDANCE WITH ASTM E84 OR UL 723. CMC 2022, CHAPTERS 7, 9 ,& 11.
16. ALL EQUIPMENT SHALL BE LATERALLY SUPPORTED IN ALL DIRECTIONS TO RESIST A MIN. OF 20% OF THE EQUIPMENT'S OPERATING WEIGHT.
17. THE EXISTING AUTOMATIC FIRE SPRINKLER SYSTEM SHALL BE MODIFIED AND EXTENDED AS REQUIRED TO PROVIDE PROTECTION FOR THE NEW TENANT DEVELOPMENT IN ACCORDANCE WITH THE REQUIREMENTS OF THE CCALIFORNIA BUILDING CODE, CHAPTER 9 SECTION 904 & NFPA 13. THE EXISTING SYSTEM SHALL BE KEPT IN OPERATION AT ALL TIMES EXCEPT WHEN "CUT-OVER" TIE-INS ARE NECESSARY. ALL MATERIALS SHALL MATCH EXISTING UNLESS NOTED OTHERWISE. CONTRACTOR SHALL SUBMIT FIRE DEPARTMENT STAMPED "APPROVED" PLANS FOR REVIEW PRIOR TO INSTALLATION OR FABRICATION. REFER TO THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
	S OR W	SOIL OR WASTE ABOVE FLOOR
	S OR W	SOIL OR WASTE BELOW FLOOR OR GRADE
SD	SD	STORM DRAIN ABOVE FLOOR
SD	SD	STORM DRAIN BELOW FLOOR OR GRADE
OD	OD	OVERFLOW DRAIN ABOVE FLOOR
	V	SANITARY VENT
	CW	COLD WATER
	HW	HOT WATER
CD	CD	CONDENSATE DRAIN
TP	TP	TRAP PRIMER
ESS	ESS	EXISTING SANITARY SEWER
ESD	ESD	EXISTING STORM DRAIN
EV	EV	EXISTING SANITARY VENT
ECW	ECW	EXISTING COLD WATER
		DIRECTION OF FLOW
	SOV	SHUT-OFF VALVE
	SOV/GC	SHUT-OFF VALVE OR GAS COCK IN YARD BOX
	GC	GAS COCK
	FCO	FLOOR CLEANOUT
	WCO	WALL CLEANOUT
		RISER UP
		RISER DOWN
	ABV	ABOVE
	AP	ACCESS PANEL
	BEL	BELOW
	CLG	CEILING
	CONT	CONTINUATION
	DN	DOWN
	EXIST	EXISTING
	FLR	FLOOR
	POC	POINT OF CONNECTION
	PLCS	PLACES
	SLVE	SLEEVE
	VTR	VENT THRU ROOF
	YB	YARD BOX
	R.I. & C.	ROUGH-IN & CONNECT

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PLUMBING GEN. NOTES, LEGEND, AND SCHEDULES

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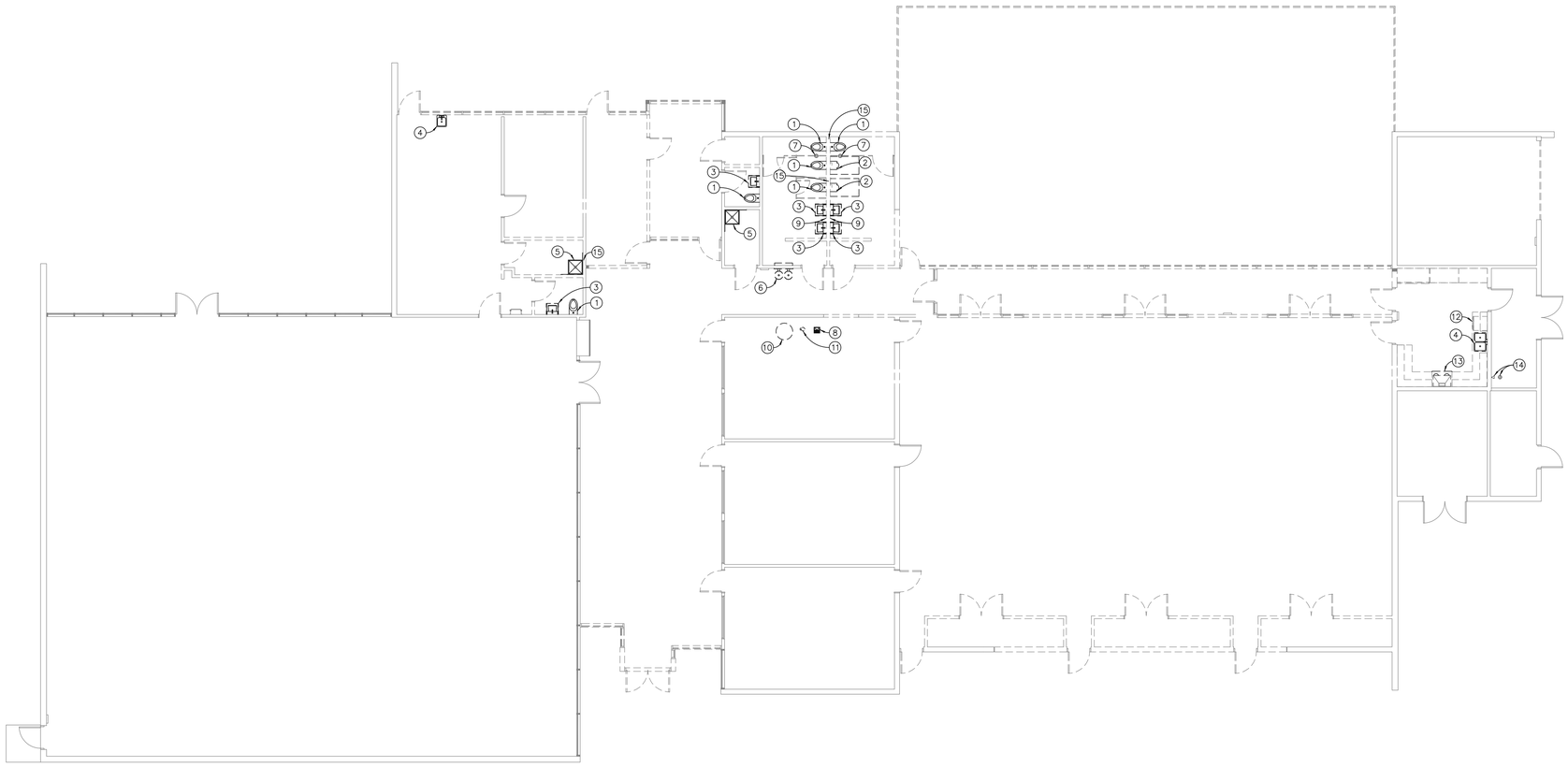

DEMOLITION NOTES:

1. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL ITEMS INDICATED TO BE REMOVED. CONTRACTOR SHALL VERIFY ALL SUCH ITEMS WITH OWNER PRIOR TO REMOVAL. ALL ITEMS NOT REFUSED BY OWNER SHALL BE REMOVED INTACT AND FULLY FUNCTIONAL BY CONTRACTOR FOR OWNER'S USE. ALL ITEMS REFUSED BY OWNER SHALL BE PROPERLY DISPOSED OF BY CONTRACTOR.
2. REMOVE EXISTING FIXTURES AND EQUIPMENT AS INDICATED. HOT WATER, COLD WATER, VENT AND/OR GAS PIPING SERVING SUCH ITEMS SHALL BE REMOVED TO A SUITABLE CONCEALED LOCATION WITHIN WALL OR ABOVE CEILING AND CAPPED OR PLUGGED UNLESS OTHERWISE NOTED (U.O.N.). WASTE PIPING SERVING SUCH FIXTURES SHALL BE REMOVED TO A SUITABLE CONCEALED LOCATION BELOW FINISHED FLOOR OR BEHIND WALL AND CAPPED OR PLUGGED U.O.N. ASSOCIATED EXISTING DEFUNCT PIPING IN CONCEALED LOCATIONS ABOVE CEILING, WITHIN WALLS, BELOW SLAB, OR BELOW GRADE SHALL BE ABANDONED IN PLACE OR REMOVED AS NECESSARY TO AVOID INTERFERENCE WITH NEW WORK. ASSOCIATED EXISTING DEFUNCT PIPING AND COMPONENTS IN EXPOSED LOCATIONS SHALL BE REMOVED U.O.N. (INCLUDING FLOOR DRAINS, WALL AND FLOOR CLEANOUTS, CLEANOUTS TO GRADE, ACCESS PANELS, SHUT-OFF VALVES AND COCKS, YARD BOXES, MANHOLES, CATCH BASINS, AND OTHER EXPOSED COMPONENTS). EXISTING DEFUNCT ELECTRICAL COMPONENTS SERVING EXISTING TO BE REMOVED EQUIPMENT SHALL BE DEMOLISHED AND REMOVED TO POINT OF ORIGIN.

DEMOLITION KEY NOTES:

1. EXISTING WATER CLOSET TO BE REMOVED BY PLUMBING CONTRACTOR.
2. EXISTING URINAL TO BE REMOVED BY PLUMBING CONTRACTOR.
3. EXISTING LAVATORY TO BE REMOVED BY PLUMBING CONTRACTOR.
4. EXISTING SINK TO BE REMOVED BY PLUMBING CONTRACTOR.
5. EXISTING SERVICE SINK TO BE REMOVED BY PLUMBING CONTRACTOR.
6. EXISTING DRINKING FOUNTAIN TO BE REMOVED BY PLUMBING CONTRACTOR.
7. EXISTING FLOOR DRAIN TO BE REMOVED BY PLUMBING CONTRACTOR.
8. EXISTING FLOOR SINK IN MEZZANINE TO BE REMOVED BY PLUMBING CONTRACTOR.
9. EXISTING HOSE BIBB TO BE REMOVED BY PLUMBING CONTRACTOR.
10. EXISTING WATER HEATER IN MEZZANINE TO BE REMOVED BY PLUMBING CONTRACTOR.
11. EXISTING CIRCULATION PUMP IN MEZZANINE TO BE REMOVED BY PLUMBING CONTRACTOR.
12. EXISTING DISHWASHER TO BE REMOVED BY PLUMBING CONTRACTOR.
13. EXISTING RANGE TO BE REMOVED BY PLUMBING CONTRACTOR.
14. EXISTING CAN WASH TO BE REMOVED BY PLUMBING CONTRACTOR.
15. EXISTING ACCESS PANEL WITH ANY PLUMBING TO BE REMOVED BY PLUMBING CONTRACTOR.

NORTH

PLUMBING DEMOLITION FLOOR PLAN

SCALE 1/8"=1'-0" | 1

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DRAWN **Author**

CHECK **Checker**

PLUMBING
DEMOLITION
FLOOR PLAN

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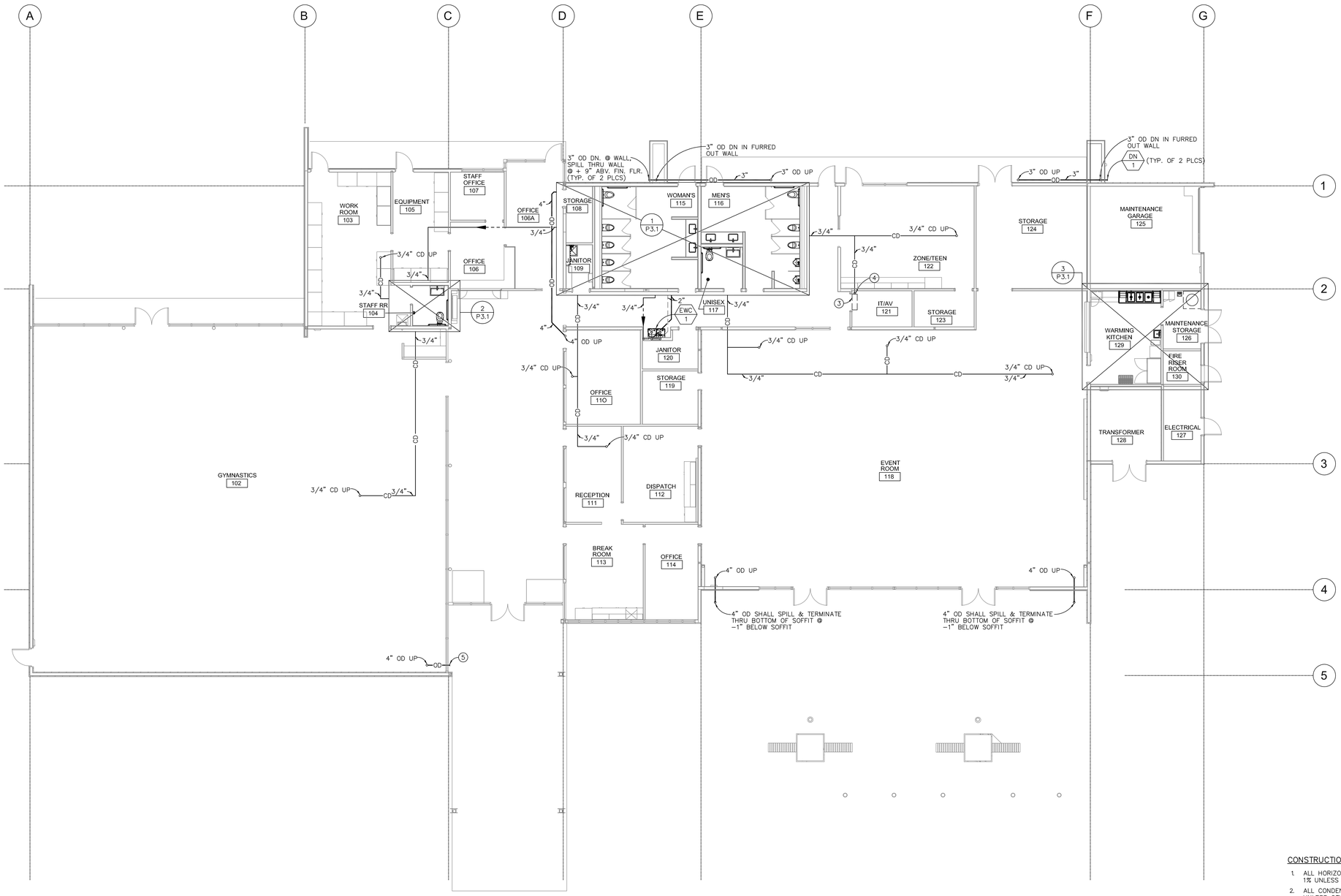

CONSTRUCTION NOTES:

1. ALL HORIZONTAL STORM DRAIN PIPING ABOVE CEILING SHALL SLOPE AT 1% UNLESS OTHERWISE NOTED.
2. ALL CONDENSATE DRAIN PIPING ABOVE CEILING SHALL SLOPE AT 1% UNLESS OTHERWISE NOTED.
3. ALL SLEEVES THRU FOOTINGS SHALL BE MINIMUM TWO PIPE SIZES LARGER THAN THE PIPE GOING THRU IT, PROVIDE ALL SLEEVES.
4. THE CONTRACTOR SHALL FIELD VERIFY ALL EXISTING UTILITIES AND POINTS OF CONNECTION PRIOR TO BIDDING PROJECT.
5. WHERE PLANS INDICATE NEW FIXTURES OR EQUIPMENT CONNECTING TO EXISTING SERVICES, PLUMBING CONTRACTOR SHALL MODIFY AND/OR EXTEND EXISTING PIPING OR ROUGH-INS AS REQUIRED TO SUIT THE NEW FIXTURE.

CONSTRUCTION KEY NOTES:

(1) CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING SERVICES FOR NEW SINK.
(2) CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING SERVICES FOR INSTA. WATER HEATER.
(3) FAN COIL ON WALL SEE MECH. DWGS. FOR EXACT LOCATION
(4) CONDENSATE PUMP PROVIDED BY MECH. CONTRACTOR
(5) 4" OD SHALL SPILL & TERMINATE THRU WALL @ -35" BELOW FINISH ROOF.

NORTH

PLUMBING RENOVATION FLOOR PLAN

SCALE 1/8"=1'-0"

1

DAHLIN
505 TECHNOLOGY DRIVE,
SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CLIENT

PDS
PocockDesignSolutions Inc.

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715
PW-23-01

BID SET 06.03.25

REVISIONS

REGISTERED PROFESSIONAL ENGINEER ANDREW R. GIGNAC No. M30639 Exp. 3/31/26 MECHANICAL STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN Author
CHECK Checker

PLUMBING RENOVATION FLOOR PLAN

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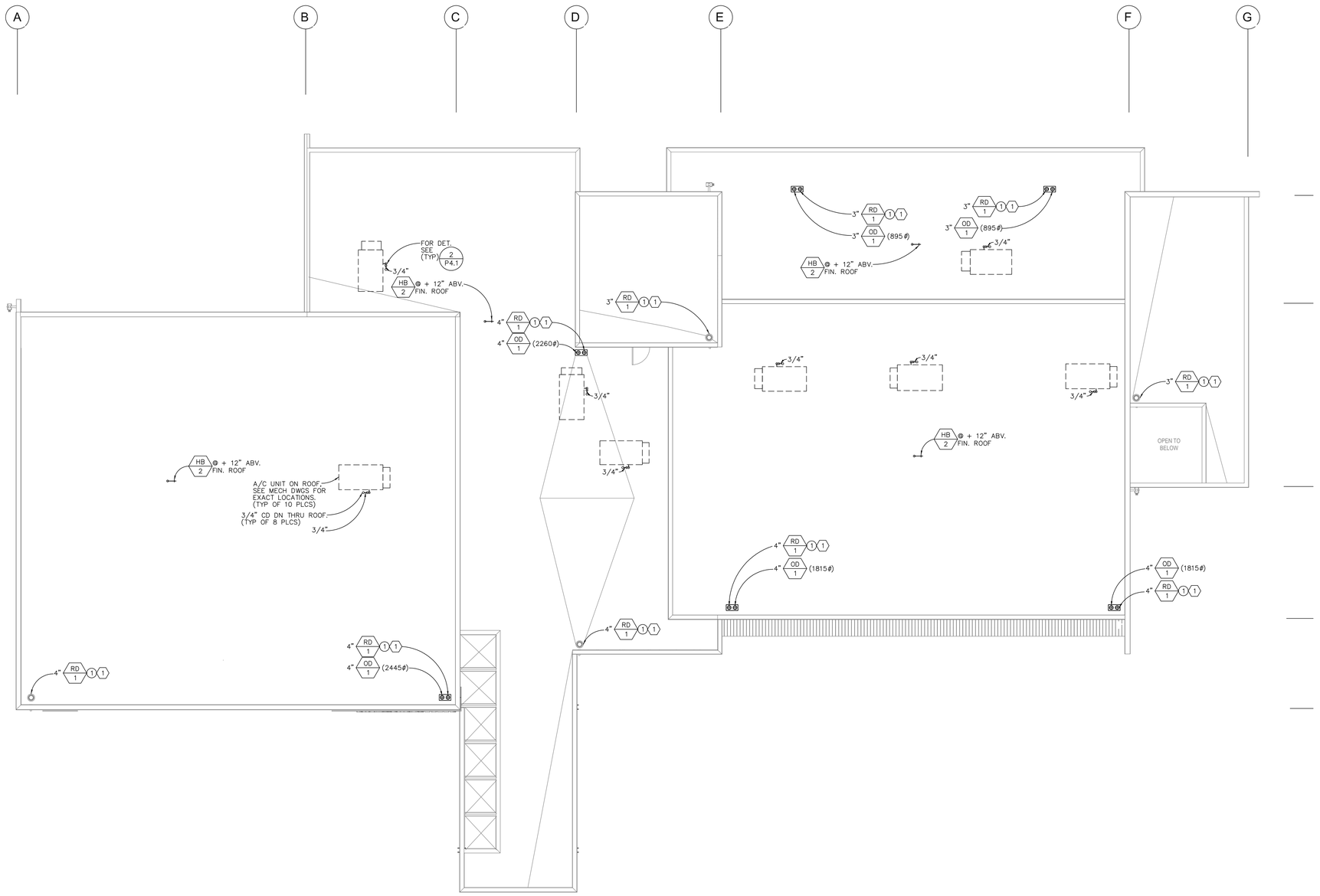

CONSTRUCTION NOTES:

1. ALL STORM DRAIN PIPE SIZES ARE BASED ON CALIFORNIA PLUMBING CODE 2019 TABLE 1103.1 & 1103.2 AT 3 " RAINFALL PER HOUR.
2. ALL HORIZONTAL STORM DRAIN PIPING SHALL SLOPE AT 1% UNLESS OTHERWISE NOTED.

DEMOLITION KEY NOTES:

(1) EXISTING ROOF DRAIN TO BE REMOVED BY PLUMBING CONTRACTOR.

CONSTRUCTION KEY NOTES:

(1) CONTRACTOR SHALL ROUGH-IN FULL LINE-SIZE AND CONNECT TO EXISTING ROOF DRAIN PIPING BELOW ROOF.

NORTH

PLUMBING RENOVATION ROOF PLAN

SCALE 1/8"=1'-0" | 1

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JOB NO. **1533.006**
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CHECK **Checker**

PLUMBING RENOVATION ROOF PLAN

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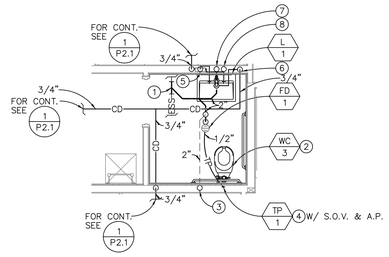
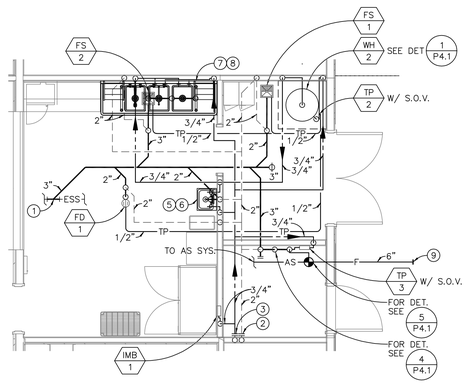


CONSTRUCTION KEY NOTES:

1. P.O.C. NEW 2" WASTE LINE TO EXISTING SEWER LINE BELOW GRADE. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.
2. CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING SERVICES FOR NEW WATER CLOSET.
3. CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING SERVICES FOR NEW FLOOR DRAIN VENT.
4. CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING SERVICES FOR NEW TRAP PRIMER WITH ACCESS PANEL.
5. MV-1 W/ A.P.
6. 3/4" CD DN IN WALL, CONNECT TO LAV TAILPIECE
7. CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING VENT FOR NEW LAVATORY VENT.
8. CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING CW FOR NEW LAVATORY CW.

PLUMBING TOILET ROOM PLAN

SCALE 1/4"=1'-0" | 2

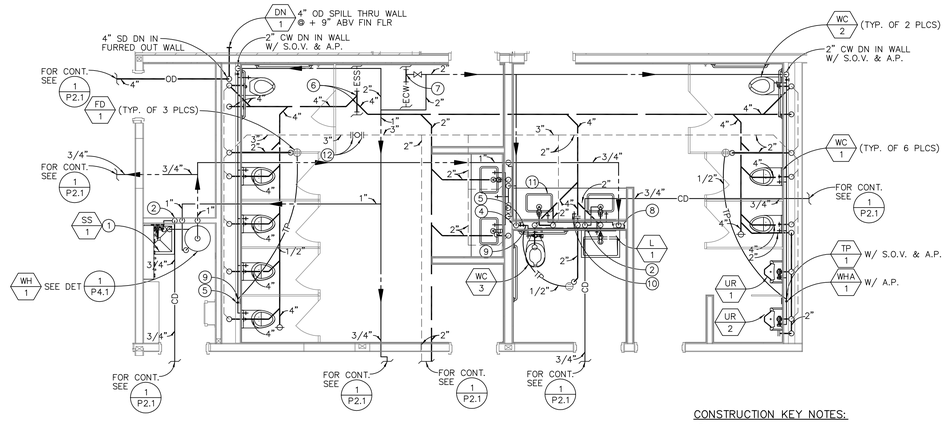


CONSTRUCTION KEY NOTES:

1. P.O.C. NEW 3" SEWER LINE TO EXISTING SEWER LINE BELOW GRADE. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.
2. P.O.C. NEW 2" VENT LINE TO EXISTING VENT THRU ROOF ABOVE CEILING. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.
3. P.O.C. NEW 3/4" COLD WATER LINE WITH SHUT-OFF VALVE TO EXISTING COLD WATER LINE ABOVE CEILING. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.
4. 1/2" COLD WATER WITH ANGLE STOP FOR COFFEE MAKER.
5. PROVIDE SYMMONS 5-210-CK-BT MIXING VALVE ASSEMBLY MOUNTED BELOW SINK WITH STAINLESS STEEL WALL CABINET. MIXING VALVE SHALL BE SET AT 110° FOR HOT WATER SUPPLY TEMPERATURE. EQ-33
6. 1/2" CW & HW AND 1-1/2" WASTE TO HAND SINK & FAUCET. EQ-33
7. 2" INDIRECT WASTE TO 3-COMPARTMENT SINK. EQ-31 EQ-34 EQ-35
8. 1/2" CW & HW TO SINK FAUCET & PRE-RINSE FAUCET. EQ-31 EQ-34 EQ-35
9. FOR CONTINUATION OF ALL UTILITIES SEE CIVIL ENGINEERING DRAWINGS.

PLUMBING KITCHEN ENLARGED PLAN

SCALE 1/4"=1'-0" | 3



CONSTRUCTION KEY NOTES:

1. CONTRACTOR SHALL ROUGH-IN AND CONNECT TO EXISTING SERVICES FOR NEW SERVICE SINK.
2. 1" CD DN IN WALL, CONNECT TO LAV TAILPIECE
3. 3/4" CD DN IN WALL, SPILL TO SERVICE SINK W/ 2" AIR GAP
4. 1-1/2" CW DN IN WALL W/ S.O.V. & A.P.
5. WH-1 W/ A.P.
6. P.O.C. NEW 4" SEWER LINE TO EXISTING SEWER LINE BELOW GRADE. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.
7. P.O.C. NEW 2" COLD WATER LINE WITH SHUT-OFF VALVE TO EXISTING COLD WATER LINE ABOVE CEILING. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.
8. MV-1 W/ A.P. (TYP. OF 2 PLCS)
9. TP-1 W/ S.O.V. & A.P.
10. HB-1 (TYP. OF 2 PLCS)
11. L-2 (TYP. OF 4 PLCS)
12. P.O.C. NEW 3" VENT LINES TO EXISTING VENT THRU ROOF ABOVE CEILING. FIELD VERIFY EXACT LOCATION PRIOR TO INSTALLATION OF ANY PIPING.

PLUMBING ENLARGED FLOOR PLAN

SCALE 1/4"=1'-0" | 1

DAHLIN
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JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

PLUMBING ENLARGED FLOOR PLAN

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P3.1

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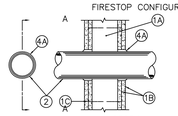
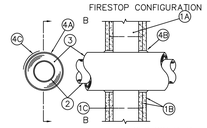
SYSTEM NO. WL1001
F RATINGS–1 AND 2 HR (SEE ITEM 4)
T RATINGS–0, 1, 1–1/2 AND 2HR. (SEE ITEM 4)

FIRESTOP CONFIGURATION "A"



SECTION A–A

FIRESTOP CONFIGURATION "B" & "C"



SECTION B–B

1. Wall Assembly – The 1 or 2 hour fire–rated gypsum wallboard/ stud wall assembly shall be constructed of the materials and in the manner described in the individual Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

   a. Studs – Steel studs to be minimum 3–5/8 inch wide by 1–3/8 inch deep channels with nominal 1/4 inch folded–hole return on flange edges, formed from minimum 0.025 inch thick (No. 25 gauge) galvanized steel. Steel studs cut 3/4 inch less in length than assembly height with ends nesting in and secured to channel–shaped galvanized steel floor and ceiling tracks with 1/2 inch long Type S–12 self–drilling, self–tapping steel screws at both sides of studs or by welding or bolted connections designed in accordance with AISI specifications. Steel stud spacing not to exceed 24 inches O.C.

   b. Wallboard Gypsum – 5/8 inch thick 4 ft. wide with square or tapered edges. Any gypsum wallboard bearing the UL Classification Marking as to Fire Resistance. Wallboard installed vertically on both sides of stud framing with joints centered over studs and with joints on opposite sides of wall staggered one stud. For 1 hour fire–rated wall assembly, a single layer of gypsum wallboard is required. For 2 hour fire–rated wall assembly, two layers of gypsum wallboard is required with outer layer joints staggered one stud from inner layer joints.

      See Wallboard, Gypsum (CKNX) category in UL Fire Resistance Directory for names of manufacturers.

   c. Fasteners – When steel channel stud framing is employed for 1 hour fire–rated wall assembly, gypsum wallboard attached to studs with 1 inch long Type S self–drilling, self–tapping bugle–head steel screws spaced 8 inches O.C. Edges of board at top, bottom and ends to the field. When steel channel stud framing is employed for 2 hour fire–rated wall assembly, inner layer of gypsum wallboard attached to stud with 1 inch long Type S self–drilling self–tapping bugle–head steel screws spaced maximum 12 inches O.C. at joint edges and in the field. Outer layer of gypsum wallboard attached to studs with 1–5/8 inch long Type S self–drilling, self–tapping bugle–head steel screws spaced maximum 12 inch O.C. at joint edges and in the field.

   d. Joint Tape and Compound – (Not Shown) – Vinyl or casein, dry or premixed joint compound applied in two coats to joints and screw or nail heads of outer layer of gypsum wallboard. Perforated paper tape, 2 inch wide embedded in first layer of compound over all joints of outer layer of gypsum wallboard.

2. Steel Pipe or Conduit – Nom 12 inch diameter (or smaller) Schedule 10S (or heavier) steel pipe, nom 6 inch diameter (or smaller) rigid steel conduit, nom 4 inch diameter (or smaller) steel E.M.T. conduit or nom 1 inch diameter (or smaller) flexible steel conduit. Steel pipes or conduits larger than nom 4 inch diameter may only be used in walls constructed using steel channel studs. A maximum of one pipe or conduit is permitted in firestop system. Pipe or conduit to be installed near center of stud cavity width and to be rigidly supported on both sides of wall assembly.

3. Pipe Covering* – (Optional) – Nom 1 or 2 inch thick hollow cylindrical heavy density (min. 4.5 pcf) glass fiber units jacketed on the outside with foil–scrim–kraft. Longitudinal joints sealed with metal fasteners of factory–applied SSL. Transverse joints sealed with metal fasteners or with butt strip tape supplied with the product.

   See Pipe and Equipment Coverings – Materials (BRGU) category in Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread value of 25 or less and a Smoke Developed value of 50 or less may be used.

4. Firestop System – Installed symmetrically on both sides of wall assembly. The hourly F Rating of the firestop system is either 1 or 2 hours, depending upon the hourly fire rating of the wall assembly in which it is installed. The hourly T Ratings of the firestop systems are dependent upon the size of the steel pipe or conduit, the absence or presence of pipe covering (Item No. 3), the firestop configuration, and the hourly fire rating of the wall assembly in which it is installed. The firestop configuration (A, B, C), is dependent upon the size of the annular space between the steel pipe or conduit (or pipe covering) and the perimeter of the circular through opening in the gypsum wallboard layers, as tabulated below:

Max. Pipe or Conduit Diameter	Nom Pipe Covering Thkns*	Annular Space	Firestop Config (a)	T Rating
1 inch	None	0–3/16"	A	1 or 2h
12 inch	None	0"–5/16"	A	0h
4 inch	None	1/4"–3/16"	B	0h
12 inch	1 inch	1/8"–3/4"	B	1 or 1–1/2h
12 inch	2 inch	1/8"–3/4"	B	1 or 1–1/2h
4 inch	1 inch	0"–7/16"	C	1 or 2h
12 inch	None	1–1/8"	C	0h

A, B & C indicate Firestop Configuration, as described in the following:

Firestop Configuration A

a. Fill, void or Cavity Material* – Caulk/Caulk fill material forced into annular space to maximum extent possible and with a min. 1/4 inch diameter bead of caulk applied to perimeter of pipe or conduit at its egress from the wall.

   Minnesota Mining & Manufacturing Co. – Types CP–25 S/L, CP–25 N/S

Firestop Configuration B

b. Fill, void or cavity materials* – Nom 1/4 inch thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 inch wide strips. Nom. 2 inch wide strip tightly wrapped around steel pipe, steel conduit or pipe covering (foil side out) with seam butted. Wrap strip layer securely bound with steel wire or aluminum foil. Edge and slit into annular space approximately 1–1/2 inch. Additional material cut to fit and the wrap strip width trapped from the wall surface. One layer of wrap strip is required when non 1 inch thick pipe coverings it used. Two layers of wrap strip are required when nom 2 inch thick pipe covering is used.

   Minnesota Mining & Manufacturing Co. – Types FS–195

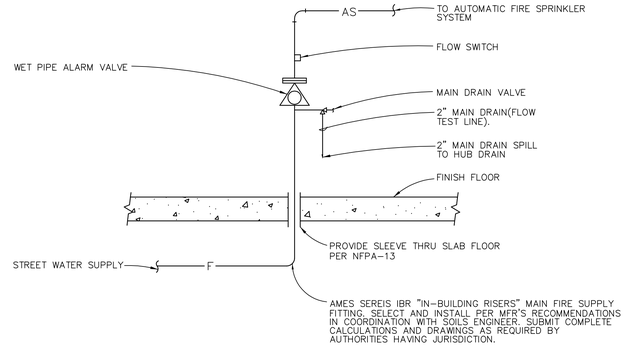
Firestop Configuration C

c. Fill, void or Cavity Materials* – Caulk – Minimum 1/4 inch diameter continuous bead applied to the wrap strip/wall interface and to the exposed edge of the wrap strip layer approximately 3/4 inch from the wall surface.

   Minnesota Mining & Manufacturing Co. – Types CP–25 S/L, CP–25 N/S

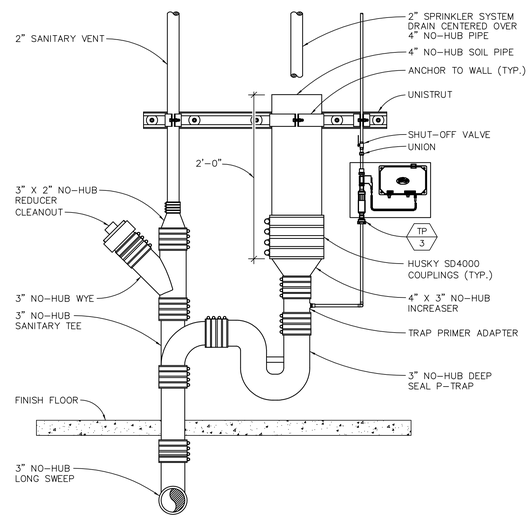
FIRE RATED PENETRATION DETAIL

SCALE	
NONE	3



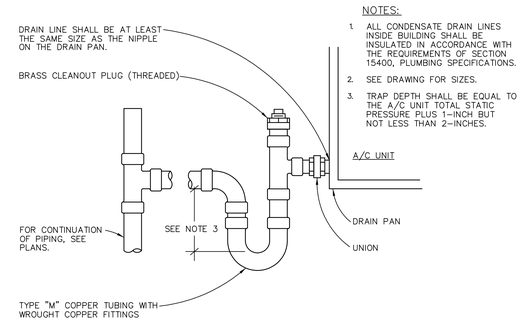
FIRE SPRINKLER RISER DETAIL

SCALE	
NONE	5



STANDPIPE DRAIN DETAIL (ELECTRONIC TP)

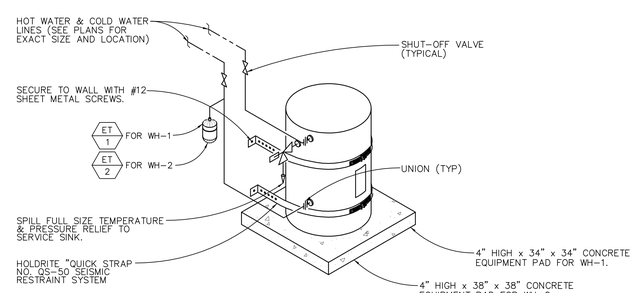
SCALE	
NONE	4



CONDENSATE TRAP DETAIL

SCALE	
NONE	2

NOTE:
WATER HEATER STRAPPING SHALL BE AT POINTS WITHIN THE UPPER ONE–THIRD (1/3) AND LOWER ONE–THIRD (1/3) OF ITS VERTICAL DIMENSIONS. AT THE LOWER POINT, A MINIMUM DISTANCE OF FOUR (4) INCHES SHALL BE MAINTAINED ABOVE THE CONTROLS WITH THE STRAPPING.



ELECTRIC WATER HEATER DETAIL

SCALE	
NONE	1

DAHLIN
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JOB NO.	1533.006
DRAWN	Author
CHECK	Checker

PLUMBING DETAILS

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LIGHT FIXTURE SCHEDULE

FBA #1197.003

TYPE	LIGHT FIXTURE DESCRIPTION	FIXTURE MAXIMUM TOTAL INPUT WATTS	FIXTURE MOUNTING	LAMP TYPE	LAMP COLOR TEMPERATURE K°	LAMP CRI, NOT LESS THAN	TOTAL ALL LAMPS INITIAL MINIMUM LUMEN OUTPUT
1	2' X 2' LED WITH 0.156-INCH PRISMATIC ACRYLIC LENS 4-INCH DEEP STEEL HOUSING, 0.156-INCH REGRESSED WHITE TRIM, 0-10V DRIVER	22	RECESSED	LED	3500	80	2500
	H.E. WILLIAMS #50 SERIES OR EQUAL						
2	36" LONG x 2.5" WIDE LED WITH WHITE OPAL LENS, EXTRUDED ALUMINUM BODY, 0-10V DRIVER, AND WHITE FINISH	25	RECESSED	LED	3500	80	3500
	FINELITE # HPXR SERIES OR EQUAL						
3	72" LONG x 2.5" WIDE LED WITH WHITE OPAL LENS, EXTRUDED ALUMINUM BODY, 0-10V DRIVER, AND WHITE FINISH	92	SURFACE	LED	3500	80	5900
	FINELITE # HPXSM SERIES OR EQUAL						
3A	SAME AS TYPE 3 EXCEPT APPROVED FOR DAMP LOCATIONS, LOWER LUMEN OUTPUT, AND NON-DIMMED.	26	SURFACE	LED	3500	80	3000
4	LED DOWNLIGHT WITH 4-INCH APERTURE, OPEN WHITE TEXTURED POWDER COAT REFLECTOR, MUD-IN FLANGE, AND NARROW LIGHT DISTRIBUTION.	9	RECESSED	LED	3500	80	1000
	H.E. WILLIAMS #4DR SERIES OR EQUAL						
5	1' X 4' LED WITH FROSTED RIBBED ACRYLIC LENS, STEEL HOUSING, SUITABLE FOR CONTINUOUS ROW MOUNTING, 0-10V DIMMING DRIVER.	23	SURFACE	LED	3000	90	3000
	H.E. WILLIAMS #39 SERIES OR EQUAL						
6	LED DOWNLIGHT WITH 8-INCH APERTURE WIDE LIGHT DISTRIBUTION, CLEAR REFLECTOR, 0-10V DIMMING DRIVER TO 1% LIGHT OUTPUT.	47	RECESSED	LED	3500	80	4000
	H.E. WILLIAMS #8DR SERIES OR EQUAL						
7	LED STRIPLIGHT 4-FEET LONG WITH ROUNDED ACRYLIC LENS, STEEL HOUSING, WHITE FINISH, NON-DIMMED	33	SURFACE	LED	3500	80	5000
	H.E. WILLIAMS #75R SERIES OR EQUAL						
8	LED EXIT SIGN WITH BRUSHED ALUMINUM FACE AND GREEN LETTERS, LACK HOUSING, AC OPERATION, UNIVERSAL MOUNTING	3	AS SHOWN	LED	NA	NA	NA
	EMERGILITE # DX SERIES ARE EQUAL						
9	LED DOWNLIGHT WITH 6-INCH APERTURE, PRISMATIC ACRYLIC LENS 4.5-INCH-DEEP RECESS DEPTH RATED FOR DAMP LOCATIONS NON-DIMMED WHITE WIDE LIGHT DISTRIBUTION.	23	RECESSED	LED	3500	80	2000
	H.E. WILLIAMS #6PR SERIES OR EQUAL						
10	LED WALL BRACKET RATED FOR WET LOCATIONS, DIE CAST ALUMINUM HOUSING, SHARP CUTOFF LIGHT DISTRIBUTION, NON-DIMMED, ACRYLIC LENS, COLOR SELECTED BY ARCHITECT, AND FORWARD LIGHT DISTRIBUTION	11	WALL	LED	4000	-	600
	VISUAL COMFORT AND CO. #7000WTAGSSD						
11	FOUR (4) 6'L X 2.5" WIDE LED LUMINARIES CONNECTED TO FORM A 6-FOOT X 6-FOOT SQUARE, EACH SIDE EXTRUDED ALUMINUM HOUSING, WHITE OPAL LENS, 0-10V DIMMABLE TO 1% LIGHT OUTPUT, COLOR AS SELECTED BY ARCHITECT, WITH WIDESPREAD 36% UP LIGHT AND 64% DOWNLIGHT	185	PENDANT	LED	3500	80	22500
	FINELITE #HPX SERIES OR EQUAL						
12	8'Lx2.5"W. LED WITH EXTRUDED ALUMINUM HOUSING, CONTINUOUS ROW MOUNTING, DOWN LIGHT ONLY, WHITE OPAL LENS, 0-10V DIMMABLE TO 1% LIGHT OUTPUT, AND COLOR AS SELECTED BY ARCHITECT.	68	SURFACE	LED	3500	80	8000
	FINELITE #HPX SERIES OR EQUAL						
13	LED BOLLARD WITH 10-INCH DIAMETER x 40-INCH HIGH CONCRETE HOUSING, DOME TOP, HORIZONTAL CAST GRILLE LOUVERS, 0.188-INCH THICK OPAL WHITE ACRYLIC DIFFUSER, NATURAL CONCRETE FINISH, NON-DIMMED, AND GRILLE COLOR AS SELECTED BY ARCHITECT.	28	GROUND	LED	3500	80	1500
	H.E. WILLIAMS #OSC10R SERIES OR EQUAL						
14	LED VANITY LIGHT WITH RECTANGULAR OPAL GLASS DIFFUSER, SATIN ALUMINUM BANDS AND BACKPLATE, 0-10V DIMMABLE.	31	WALLL	LED	3500	80	1600
	KUZCO LIGHTING #701313 SERIES OR EQUAL						
15	LED DOWNLIGHT WITH 6-INCH APERTURE, CLEAR SPECULAR REFLECTOR, NON-DIMMED.	19	RECESSED	LED	3500	80	1900
	H.E. WILLIAMS #6DR SERIES OR EQUAL						
16	LED BULKHEAD WALL PACK WITH DIE CAST ALUMINUM HOUSING, OPEN POLYCARBONATE WHITE DIFFUSER AND INTEGRAL PHOTOCELL.	20	WALL	LED	3500	80	2200
	H.E. WILLIAMS #WLRD SERIES OR EQUAL						
17	2'L UNDERCABINET LIGHT WITH STEEL HOUSING PAINTED WHITE, FROSTED ACRYLIC 0.125" THICK LENS, AND NON-DIMMED.	12	SURFACE	LED	3500	80	1200
	HE. WILLIAMS #1SF SERIES OR EQUAL						
18	LED 24-INCH DIAMETER x 5-INCH HIGH WITH METAL SIDES AND FLAT ACRYLIC DIFFUSER, ALL FINISHED MATTE WHITE. 0-10V DIMMABLE TO 1% LIGHT OUTPUT, AND INTEGRAL POWER SUPPLY.	53		LED	3500	90	4900
	DAY-O-LIGHT #EQL-1923-D SERIES OR EQUAL						

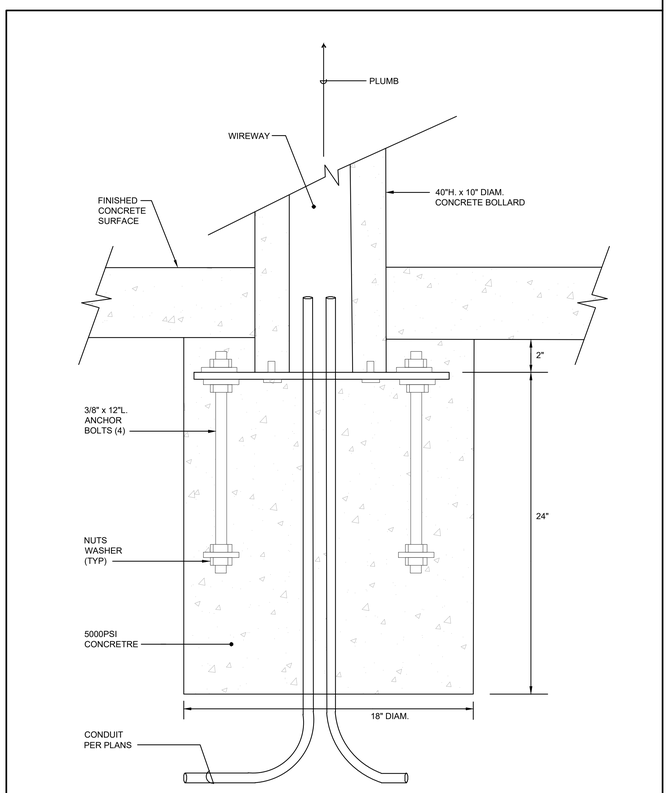
GENERAL NOTES

ALL WORK SHALL BE DEISIGNED PER 2023 LOS ANGELES COUNTY ELECTRICAL CODE, 2022 CALIFORNIA ELECTRICAL CODE, AND 2020 NATIONAL ELECTRICAL CODE.

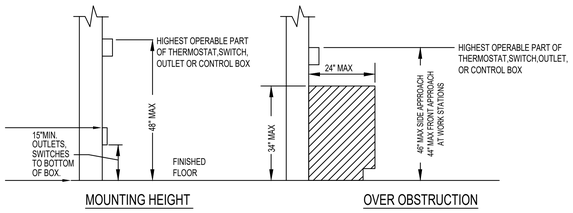
ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.

THE MAXIMUM COMBINED VOLTAGE DROP ON BOTH INSTALLED FEEDER CONDUCTORS AND BRANCH CIRCUIT CONDUCTORS TO THE FARTHEST CONNECTED LOAD OR OUTLET SHALL NOT EXCEED 5 PERCENT.

HPS	HIGH PRESSURE SODIUM	IN or "	INCHES
A.F.F.	ABOVE FINISH FLOOR	IG	ISOLATED GROUND
A.F.G.	ABOVE FINISH GRADE	J-BOX	JUNCTION BOX
AWG	AMERICAN WIRE GAUGE	KVA	KILOVOLT AMPERES
AMP, A	AMPERE	KW	KILOWATT
A.I.C.	AMPERES INTERRUPTING CAPACITY (SYMMETRICAL)	LCL	LONG CONTINUOUS LOAD
AF/AT	AMP FRAME, AMP TRIP	L.F.	LINEAR FEET
AS/AF	AMP SWITCH, AMP FUSE	LTG, LTS	LIGHTING
CIRC.,CKT.	CIRCUIT	LPS	LOW PRESSURE SODIUM
CB	CIRCUIT BREAKER	MCB	MAIN CIRCUIT BREAKER
C	CONDUIT	MLO	MAIN LUGS ONLY
C.O.	CONDUIT ONLY	MH	METAL HALIDE
CONN	CONNECTED	MCC	MOTOR CONTROL CENTER
CLCB	CURRENT LIMITING CIRCUIT BREAKER	MCM	THOUSAND CIRCULAR MILS
DIA	DIAMETER	MCP	MOTOR CIRCUIT PROTECTOR
EMCS	ENERGY MANAGEMENT CONTROL SYSTEM	MTD	MOUNTED
EMT	ELECTRICAL METALLIC TUBING	MW	MICROWAVE
EWC	ELECTRIC WATER COOLER	NEC	NATIONAL ELECTRICAL CODE
E-O-L	END-OF-LINE CIRCUIT TERMINATOR	NC	NORMALLY CLOSED
EF	EXHAUST FAN	NO	NORMALLY OPEN
FT or '	FEET	NF	NON-FUSED
FA	FIRE ALARM	NIC	NOT IN CONTRACT
FLA	FULL LOAD AMPS	NO or #	NUMBER
GFI	GROUND FAULT INTERRUPTER	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED.
GRD	GROUND	PRIMARY	OVER 600 VOLTS
HOA	HAND-OFF-AUTO	PH or Ø	PHASE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING	PROVIDE	FURNISH, INSTALL AND CONNECT.



FIXTURE TYPE 13 ANCHORAGE DETAIL | NO SCALE | 1



MOUNTING HEIGHT OVER OBSTRUCTIONS

SYMBOL LIST

(ALL SYMBOLS NOT NECESSARILY USED ON THESE DRAWINGS)
ALL SYMBOL DESCRIPTIONS ARE SUBJECT TO MODIFICATION AS NOTED ON THE DRAWINGS

- CIRCUIT BREAKER
- SAFETY SWITCH (DISCONNECT), HORSE POWER RATED. FUSED OR UNFUSED AS NOTED, MOUNT ON WALL +45", OR ON EQUIPMENT +36".
- CONDUIT, INSTALLED CONCEALED IN WALL OR IN CEILING SPACE. 3/4" C - 2 #12, 1#12 GRD. 3/4" C - 3 #12, 1#12 GRD. 3/4" C - 4#12,1#12 GRD.
- CONDUIT, INSTALLED CONCEALED IN OR UNDER FLOOR OR BELOW GRADE, 3/4" CONDUIT MINIMUM.
- EXISTING CONDUIT.
- HOMERUN TO PANEL "B" FOR CIRCUITS 5 AND 7 WITH SEPARATE NEUTRALS. B-5,7
- LIGHTING FIXTURE, RECESS MOUNTED, ON FLUSH CEILING MOUNTED OUTLET BOX..
- LIGHTING FIXTURE, SURFACE OR FLUSH MOUNTED AS INDICATED ON FIXTURE SCHEDULE, ON WALL MOUNTED OUTLET BOX, +90". STEM INDICATES WALL MOUNTED OUTLET BOX, TYPICAL.
- 2 / 100 FIXTURE SCHEDULE DESIGNATION: "2" INDICATES FIXTURE TYPE, "100" INDICATES FIXTURE TOTAL WATTAGE.
- EXIT SIGN SINGLE FACE, ON FLUSH CEILING MOUNTED OUTLET BOX. ARROW INDICATES DIRECTIONAL ARROW OF EXIT SIGN FACE.
- EXIT SIGN DOUBLE FACE, ON FLUSH CEILING MOUNTED OUTLET BOX.
- EXIT SIGN, ON FLUSH WALL MOUNTED OUTLET BOX, +90".
- STRIP OR INDUSTRIAL LIGHTING FIXTURE,SURFACE,CHAIN OR PENDANT MOUNTED ON FLUSH MOUNTED OUTLET BOX.
- LIGHTING FIXTURE RECESSED MOUNTED WITH OUTLET BOX AND REMOTE MOUNTED JUNCTION BOX CONCEALED ABOVE ACCESSIBLE CEILING. PROVIDE FLEXIBLE CONDUIT CONNECTION 6 FT. MAXIMUM LENGTH, 1/2" DIAMETER MINIMUM, FROM JUNCTION BOX TO FIXTURE OUTLET. PROVIDE CONDUCTORS IN CONDUIT, QUANTITY AS REQUIRED FOR INDICATED CIRCUITS AND SWITCHING CONTRLS, #12(AWG) MINIMUM.
- REGRESSED 120V RECEPTACLE CLOCK OUTLET ON FLUSH WALL MOUNTED OUTLET BOX, +90" WITH 12" ROUND ANALOG CLOCK.
- COMPUTER/VOICE OUTLET WITH FOUR (4) COMPUTER CONNECTOR, ON FLUSH WALL MOUNTED OUTLET BOX AT + 18", UNLESS NOTED OTHERWISE. PROVIDE 1" CONDUIT TO ACCESSIBLE CEILING SPACE. "C" INDICATES HORIZONTAL FLUSH WALL MOUNT MOUNTED OUTLET BOX +6" ABOVE COUNTER SPLASH. PROVIDE CATEGORY 6A CABLE FROM EACH CONNECTOR TO MDF RACK.
- COMPUTER OUTLET WITH TWO (2) COMPUTER CONNECTORS, IN EMPTY FLUSH WALL MOUNTED OUTLET BOX, +18", PROVIDE 1"C. STUBBED INTO CEILING SPACE. PROVIDE CATEGORY 6A CABLE FROM EACH CONNECTOR TO MDF RACK. "C" INDICATES FLUSH WALL MOUNT OUTLET BOX +6" ABOVE COUNTER BACKSPLASH.
- WAP TWO (2) CATEGORY 6A COMPUTER CONNECTORS ON FLUSH CEILING MOUNTED OUTLET BOX FOR WIRELESS ACCESS POINT. PROVIDE CATEGORY 6A CABLE FROM EACH CONNECTOR TO BUILDING MDF.
- WP C CCTV CAMERA OUTLET PROVIDE FLUSH WALL MOUNTED WEATHERPROOF OUTLET BOX AND 1"C. STUB INTO ACCESSIBLE CEILING SPACE FOR ROUTING OF CABLING. PROVIDE CATEGORY 6A CABLE FROM TO OUTLET BOX WITH 12-INCHES OF SLACK CABLE COILED IN BOX WITH CAT-6A MODULAR CONNECTOR. "WP" INDICATES WEATHERPROOF GASKETED OUTLET BOX.
- COMBINATION ON/OFF/DIMMER SWITCH FOR LOW VOLTAGE CONTROL OF LIGHTING, ON FLUSH WALL MOUNTED OUTLET BOX, +45".
- DUPLEX CONVENIENCE RECEPTACLE VERTICAL ON FLUSH WALL MOUNTED OUTLET BOX, +18". STEM INDICATES WALL MOUNTED OUTLET BOX, TYPICAL.
- DUPLEX CONVENIENCE RECEPTACLE ON FLUSH WALL MOUNTED OUTLET BOX 6-INCHES ABOVE COUNTER TOP. REFER TO ARCHITECTURAL DRAWINGS FOR COUNTER HEIGHT.
- DUPLEX CONVENIENCE RECEPTACLE ON FLUSH WALL MOUNTED OUTLET BOX +18" WITH COVER PLATE INDICATING OUTLET CONTROLLED BY ROOM OCCUPANCY SENSOR
- DOUBLE DUPLEX (FOUR-PLEX) CONVENIENCE RECEPTACLE ON ONE FLUSH WALL MOUNTED OUTLET BOX +18".
- JUNCTION BOX, FLUSH WALL MOUNTED, +18".
- JUNCTION BOX CONCEALED ABOVE ACCESSIBLE CEILING.
- INDICATES CONNECTION TO EQUIPMENT AS REQUIRED, TYPICAL.
- THERMOSTAT ON FLUSH WALL MOUNTED OUTLET BOX, REFER TO MECHANICAL DRAWINGS FOR HEIGHT AND LOCATION.
- A E-1 PANELBOARD, ADJACENT LINE INDICATES PANEL FRONT. ADJACENT BALLOON INDICATES PANEL DESIGNATION "A", SEE DRAWING E-1 FOR PANEL SCHEDULE.
- 2 SINGLE POLE TOGGLE SWITCH, ON FLUSH WALL MOUNTED OUTLET BOX, +45". INSTALL MULTIPLE SWITCHES UNDER COMMON COVER PLATE. SUBSCRIPT OR SUPERSCRIPT AT SWITCH SYMBOL INDICATES THE FOLLOWING: 2 - DOUBLE POLE 3 - MULTI POLE M - MANUAL MOTOR STARTERS K-KEY OPERATED
- LINE VOLTAGE OCCUPANCY SENSOR ON FLUSH CEILING MOUNTED OUTLET BOX FOR LIGHTING CONTROL.
- OS LIGHTING CONTROL SYSTEM OCCUPANCY MOTION SENSOR AND ROOM CONTROLLER ON FLUSH CEILING MOUNTED OUTLET BOX.
- LS LIGHTING SENSOR,CEILING MOUNTED, FOR LOW VOLTAGE DAYLIGHTING CONTROL.
- PC PLUG LOAD CONTROLLER W/OUTLET BOX IN CEILING SPACE CONNECTED TO ROOM OCCUPANCY SENSOR.
- RC LIGHTING CONTROL RELAYS IN NEMA I WALL MOUNTED ENCLOSURE MOUNTED +8' OR AS NOTES, WITH SEPERATE RELAY AND ON/OFF/DIM CONTROLS FOR EACH SWITCH IN ROOM.
- FIRE ALARM SMOKE DETECTOR - CEILING MOUNTED.
- FIRE ALARM SPEAKER/STROBE - CEILING MOUNTED.
- FIRE ALARM EXTERNAL SPEAKER AT +7'-6" OR AS NOTED.
- FIRE ALARM HEAT DETECTOR - SURFACE MOUNTED IN CEILING ATTIC SPACE.
- FIRE ALARM MANUAL PULLSTATION, FLUSH WALL MOUNTED.
- WP S EXTERIOR SPEAKER AND VANDALPROOF GRILLE ON FLUSH IN WALL BACKBOX, +8' OR AS NOTED.
- K INTRUSION DETECTION SYSTEM KEY PAD, FLUSH WALL MOUNTED +45" WITH 1"C., STUBBED TO ACCESSIBLE CEILING SPACE. PROVIDE CABLE FROM KEYPAD TO INTRUSION DETECTION CONTROL PANEL.
- D INTRUSION DETECTION SYSTEM DOOR CONTACTS MOUNTED FLUSH IN-DOOR. PROVIDE CABLE FROM CONTACT TO DESIGNATED TERMINAL CABINET.
- F FLUSH OUTLET BOX AT +44" FOR WEATHERPROOF FOB READER FOR ACCESS CONTROL SYSTEM.
- INTRUSION DETECTION SYSTEM MOTION SENSOR, ON FLUSH CEILING MOUNTED OUTLET BOX. PROVIDE CABLE FROM SENSOR TO DESIGNATED TERMINAL CABINET.
- S SPEAKER, HOUSING & GRILLE, FLUSH CEILING MOUNTED PUBLIC ADDRESS SYSTEM. Z2 INDICATES PAGING ZONE.
- S AUTONOMOUS PUBLIC ADDRESS SYSTEM SPEAKER IN FLUSH CEILING BACKBOX WITH GRILLE.
- L 3/4"C. WITH LOW VOLTAGE COMMUNICATIONS CABLE FOR LIGHTING CONTROL.
- D COMPUTER/DATA PROCESSING SYSTEM - 3/4"C. WITH CAT 6 CABLING AS SPECIFIED. D1 - 1"C. WITH CABLING AS SPECIFIED. D2 - 1 1/4"C. WITH CABLING AS SPECIFIED. D3 - 1 1/2"C. WITH CABLING AS SPECIFIED.
- S 3/4"C. WITH SPEAKER CABLE FOR ONE SPEAKER ZONE.
- S2 3/4"C. WITH SPEAKER CABLE FOR TWO SPEAKER ZONES.
- S3 1"C. WITH SPEAKER CABLE FOR THREE SPEAKER ZONES.
- A 3/4"C. WITH CABLING FOR CARD READER/DOOR FOB LOCKING MECHANISM.

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FBA Job Number: 1197.003

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

REGISTERED PROFESSIONAL ENGINEER STEPHEN R. ZAJDEL No. E 10372 Exp. 09-30-26 ELECTRICAL CIVIL STATE OF CALIFORNIA

06/06/2025

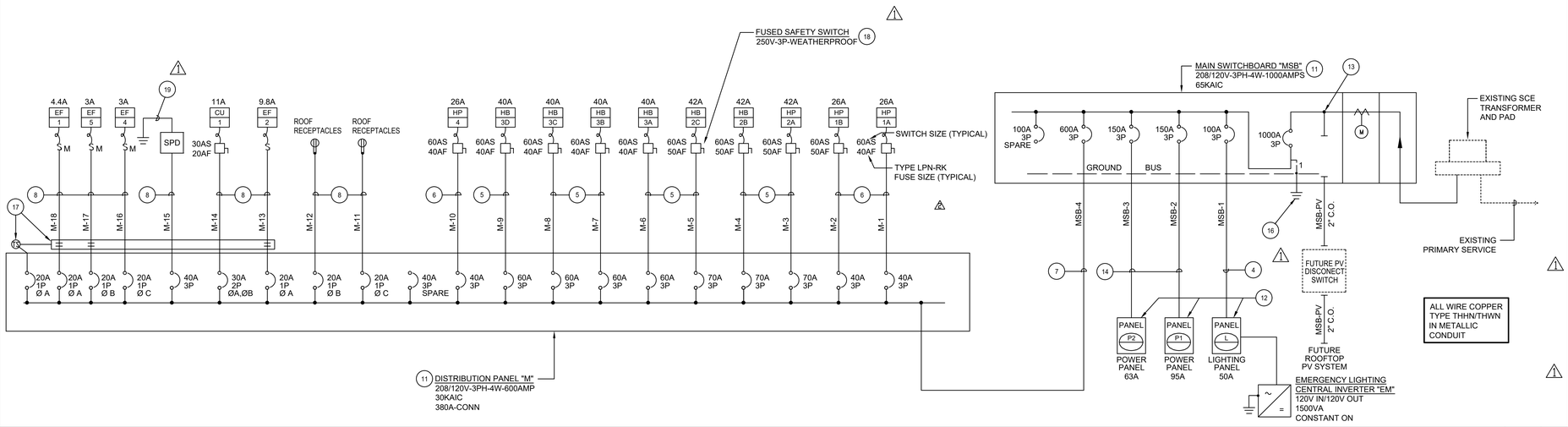
SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

SYMBOL LIST, FIXTURE SCHEDULE

SHEET
E0.1

3/4/2023 12:58:15 PM
FBA Engineering / Plot Date: 6/6/2025 10:02 AM / Plotted by: Blake Meech / Drawing Location: I:\1197\003\CLEAN SET\E0.1_SYMBOL LIST AND FIXTURE SCHEDULE_1197.003.dwg



SINGLE LINE DIAGRAM

SCALE: NONE — 1

REFERENCE NOTES:

1. DISCONNECT AND REMOVE EXISTING SWITCHBOARD.
2. DISCONNECT AND REMOVE EXISTING PANELS.
3. DISCONNECT AND REMOVE EXISTING FEEDER CONDUCTORS AND CONDUITS.
4. 4#1, 1#6 GROUND - 2"C.
5. 3#4, 1#6 GROUND - 1.25"C.
6. 3#8, 1#6 GROUND - 1.25"C.
7. 2-3"C. WITH 4-350 MCM AND 1#1 GROUND IN EACH.
8. 2#10, 1#10 GROUND – 3/4"C.
9. 4#8, 1#8 GROUND - 1"C.
10. 6#10, 1#10 GROUND - 1"C.
11. SWITCHBOARD SHALL BE FULLY RATED FOR THE FAULT CURRENT SHOWN.
12. PANELS AND ALL CIRCUIT BREAKERS CONTAINED INSIDE SHALL BE FULLY RATED FOR 22KAIC.
13. LUGS AHEAD OF MAIN CIRCUIT BREAKER FOR FUTURE PV CONNECTION.
14. 4#1/0, 1#4 GROUND - 2"C.
15. PROVIDE GFCI TYPE CIRCUIT BREAKER.
16. BOND 1#3/0 TO UFER GROUND BUS IN MAIN ELECTRICAL ROOM. SEE DETAIL 3 THIS SHEET.
17. PROVIDE 3-POLE 20AMP MECHANICALLY HELD CONTACTOR IN NEMA I ENCLOSURE MOUNTED NEAR PANEL M FOR CONTROL OF EXHAUST FANS. PROVIDE TIMESWITCH TO CONTROL CONTACTOR. TIMESWITCH SHALL BE INTERMATIC #ET2000 SERIES OR EQUAL WITH SPDT CONTACTS. SET TIMESWITCH TO TURN FANS OFF FROM 10PM TO 8AM AND ALLOW FANS TO RUN FROM 8AM TO 10PM (VERIFY SETTINGS WITH CITY).
18. PROVIDE WEATHERPROOF FUSED SWITCH ON PACKAGED ROOFTOP HEAT PUMP. COORDINATE EXACT LOCATION WITH HVAC INSTALLER AND POSITION SWITCH FOR MINIMUM 3 FEET CLEARNCE IN FROMT AND SO AS NOT TO CONFLICT WITH HVAC EQUIPMENT. PROVIDE CLASS RK FUSES IN SWITCH, SIZE AS INDICATED ON NAMEPLATE OF HEAT PUMP.
19. PROVIDE 1#6 GROUND IN 3/4"C. TO UFER GROUND BUS. SEE DETAIL 3 THIS SHEET.
20. INDICATES CIRCUIT CONTROLLED BY LIGHTING CONTROL PANEL "LCP" IN ROOM 121 PER DETAIL 3 SHEET E2.1. EACH RELAY INTERFACED WITH PHOTOCELL TO PREVENT DAYTIME OPERATION.

Date of Response: 10/18/2024

SOUTHERN CALIFORNIA EDISON
An EDISON INTERNATIONAL Company

Response to Letter of Request for Short Circuit Current Value for Panel Sizing and Protection Coordination

Disclaimer:

SCE provides the information contained in this letter on an "as is" basis without warranty of any kind, either express or implied. This disclaimer of liability applies to any claim or cause of action for damages or injuries occurring as a result of any error, omission, deletion or defect in the content of the information provided, including, but not limited to, negligence, breach of contract, or tort. Under no circumstances shall SCE or any of its parent or affiliate companies, employees, directors or shareholders be liable to any party for (i) any direct, indirect, special, punitive, incidental, exemplary, consequential, or any other damages arising in any way out of the availability, use or reliance on the information provided; or (ii) any claim attributable to errors, omissions or other inaccuracies in the information provided herein.

The values provided below are maximum Short Circuit values, based on current distribution system conditions. Utility distribution systems are dynamic, and the electrical characteristics of the system can vary significantly due to abnormal conditions, upgrades, modifications, and temporary or permanent reconfigurations. Therefore, the Short Circuit values provided above are subject to change frequently and without notice. SCE does not guarantee to hold the system parameters represented in this information constant. Consequently, SCE recommends that all electrical work on the service panel main breaker should be done in a de-energized condition to eliminate arc flash hazard at this location.

To: Customer: City of Lakewood — Phone: N/A
Address: 12305 207th St — Fax: N/A
City, Zip: Lakewood, CA — Email: N/A

From: Southern California Edison (SCE) - Engineering &Technical Services - Field Engineering

Engineer: Juliet Arteaga — Phone: 310-386-4868
Address: 1924 E Cashdan St — Fax: N/A
City, Zip: Compton, CA 90220 — Email: Juliet.arteaga@sce.com

Subject: Southern California Edison's Contribution to Short Circuit Current at the Point-of-Connection of the SCE's Service Conductors to the Customer's Service Entrance Facilities (see disclaimer above)

Project: Name: City of Lakewood
Address: 5050 Clarke Ave
City, Zip: Lakewood, CA
Structure #: P5134776

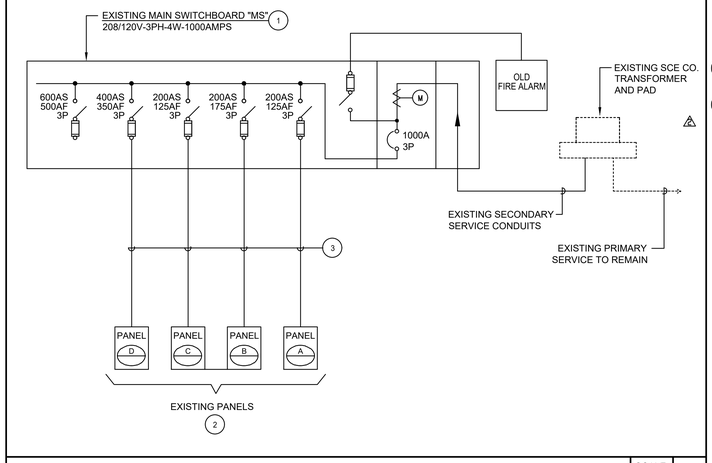
(1) The voltage and service configuration to be utilized for this project will be 208 volts 3 phase 3 wire, to serve your 1000 Ampere main switchboard

(2) SCE's contribution to Short Circuit Current, **at the time of calculation**, is approximately 12,200 Amperes (3-phase) and 13,300 Amperes (phase-ground). **The 3-phase X/R = 1.65 and the phase-ground X/R = 1.73.**

Service Conductors: 1 runs of 700 Size (☒ Al ☐ Cu)
Distance from Transformer: 45 feet
Transformer: 150 kVA, 3 phase, %Z = 2.7
☒**Existing Transformer** ☐**New Transformer**
Comments:

(3) SCE's **maximum** contribution to Short Circuit Current is approximately 34,700 Amperes (3-phase), and 36,400 Amperes (phase-ground). These maximum Short Circuit Current values are based on SCE's largest transformer capable of serving your 1,000 Ampere main service switchboard (at 100% rating).

Service Conductors: 4 runs of 700 Size (☒ Al ☐ Cu)
Distance from Transformer: 45 feet
Transformer: 500 kVA, 3 phase, %Z = 3.6
Comments:



DEMOLITION SINGLE LINE DIAGRAM

SCALE: NONE — 2

PALMS PARK COMMUNITY CENTER — PROJECT NO. 1197.003
VOLTS 120/208 — PANELBOARD L — MAIN MLO
PHASE 3PH, 4W — BUS 100A
MTG SURFACE — LOCATION ROOM 121

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
1	551	-----	-----	L	20/1	24	TOILETS, TEEN ROOM
3	-----	741	-----	L	20/1	28	STORAGE, UTILITY ROOM
5	-----	-----	752	L	20/1	34	WORK ROOM AND OFFICE
7	767	-----	-----	L	20/1	12	CORRIDOR
9	-----	759	-----	L	20/1	33	OFFICES
11	-----	-----	1292	L	20/1	19	GYM
13	952	-----	-----	L	20/1	14	GYM
15	-----	200	-----	L	20/1	8	GYM
17	-----	-----	1000	L	20/1	4	SKYLITES
19	1000	-----	-----	L	20/1	4	SKYLITES
21	-----	-----	-----		20/1		SPARE
23	-----	-----	-----		20/1		SPARE
25	-----	-----	-----		20/1		SPARE
27	-----	-----	-----		20/1		SPARE
29	-----	-----	1200	L	20/1		EMERG. INVERTER

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
A 2	360	-----	-----	L	20/1	10	EXTERIOR NITE LIGHTS
B 4	-----	396	-----	L	20/1	11	EXTERIOR LIGHTS
C 6	-----	-----	252	L	20/1	9	BOLLARDS
A 8	477	-----	-----	L	20/1	9	ASSEMBLY
B 10	-----	555	-----	L	20/1	3	ASSEMBLY
C 12	-----	-----	371	L	20/1	7	ASSEMBLY
A 14	78	-----	-----	L	20/1	3	EXTERIOR CANOPY NITE LIGHTS
B 16	-----	130	-----	L	20/1	5	EXTERIOR CANOPY
C 18	-----	-----	264	L	20/1	8	MEZZANINE
A 20	-----	-----	-----				PROVISION
B 22	-----	-----	-----				PROVISION
C 24	-----	-----	-----				PROVISION
A 26	-----	-----	-----				PROVISION
B 28	-----	-----	-----				PROVISION
C 30	-----	-----	-----				PROVISION

CONNECTED: VA AMPS
PHASE A = 11280 94
PHASE B = 11280 94
PHASE C = 5580 47
TOTAL = 28140 78

L.C.L. @ 125% = 14270
RECEPT. ( ) 10 kVA @ 50% = 9600
KITCHEN @ 65% = 23870
OTHER LOAD @ 100% = 66
TOTAL VA = 66
TOTAL AMPS =

LOAD TYPES:
G - GENERAL (100%) M - MOTOR (100%)
L - L.C.L. (125%) M1 - MOTOR (125%)
R - RECEPTACLE (50%) X - X-RAY (100%)
(10 kVA @ 100%) X1 - X-RAY (50%)
K - KITCHEN (65%)

PALMS PARK COMMUNITY CENTER — PROJECT NO. 1197.003
VOLTS 120/208 — PANELBOARD P1 — MAIN MLO
PHASE 3PH, 4W — BUS 225A
MTG SURFACE — LOCATION ROOM 121

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
1	720	-----	-----	R	20/1	4	WORK ROOM
3	-----	720	-----	R	20/1	4	EQUIPT. ROOM
5	-----	-----	540	R	20/1	3	GYM
7	540	-----	-----	R	20/1	3	GYM
9	-----	900	-----	R	20/1	5	STAFF OFFICE
11	-----	-----	900	R	20/1	5	STAFF OFFICE
13	720	-----	-----	R	20/1	4	STAFF OFFICE
15	-----	720	-----	R	20/1	4	STAFF OFFICE
17	-----	-----	720	R	20/1	4	OFFICE
19	720	-----	-----	R	20/1	4	OFFICE
21	-----	720	-----	R	20/1	4	STORAGE
23	-----	-----	720	R	20/1	4	DISPATCH
25	540	-----	-----	R	20/1	3	DISPATCH
27	-----	540	-----	R	20/1	3	DISPATCH
29	-----	-----	720	R	20/1	4	OFFICE
31	720	-----	-----	R	20/1	4	OFFICE
33	-----	360	-----	R	20/1	1	BREAK ROOM
35	-----	-----	720	R	20/1	4	BREAK ROOM
37	180	-----	-----	R	20/1	1	BREAK ROOM
39	-----	180	-----	R	20/1	1	BREAK ROOM
41	-----	-----	-----		20/1		SPARE

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
A 2	4800	-----	-----	G	50/2	1	WH-2 BANQUET
B 4	-----	4800	-----	G	--	--	-----
C 6	-----	-----	180	R	20/1	1	BANQUET ROOM
A 8	180	-----	-----	R	20/1	1	BANQUET ROOM
B 10	-----	360	-----	R	20/1	2	BANQUET ROOM
C 12	-----	-----	360	R	20/1	2	UTILITY ROOM
A 14	900	-----	-----	R	20/1	5	MAINTENANCE
B 16	-----	900	-----	R	20/1	1	MDF
C 18	-----	-----	180	R	20/1	1	BANQUET ROOM
A 20	360	-----	-----	R	20/1	2	BANQUET ROOM
B 22	-----	540	-----	R	20/1	3	TEEN ZONE
C 24	-----	-----	180	R	20/1	1	TEEN ZONE TV
A 26	540	-----	-----	R	20/1	3	TEEN ZONE
B 28	-----	540	-----	R	20/1	3	TEEN ZONE
C 30	-----	-----	360	R	20/1	2	TEEN ZONE
A 32	360	-----	-----	R	20/1	2	TEEN ZONE
B 34	-----	-----	-----		30/2	1	SPARE
C 36	-----	-----	-----		20/1		-----
A 38	-----	-----	-----		50/2		SPARE
B 40	-----	-----	-----		--	-	-----
C 42	-----	-----	-----		20/1		SPARE

CONNECTED: VA AMPS
PHASE A = 11280 94
PHASE B = 11280 94
PHASE C = 5580 47
TOTAL = 28140 78

L.C.L. @ 125% = 15121
RECEPT. ( ) 10 kVA @ 50% =
KITCHEN @ 65% =
OTHER LOAD @ 100% =
TOTAL VA = 15121
TOTAL AMPS = 42

LOAD TYPES:
G - GENERAL (100%) M - MOTOR (100%)
L - L.C.L. (125%) M1 - MOTOR (125%)
R - RECEPTACLE (50%) X - X-RAY (100%)
(10 kVA @ 100%) X1 - X-RAY (50%)
K - KITCHEN (65%)

PALMS PARK COMMUNITY CENTER — PROJECT NO. 1197.003
VOLTS 120/208 — PANELBOARD P2 — MAIN MLO
PHASE 3PH, 4W — BUS 225A
MTG SURFACE — LOCATION ROOM 121

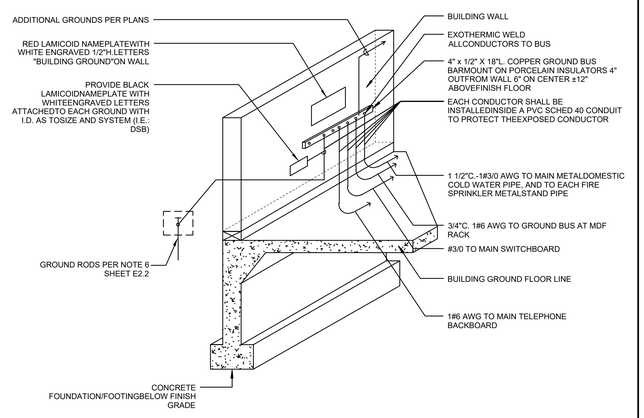
CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
1	360	-----	-----	R	20/1	2	ELECTRIC ROOM
3	-----	900	-----	R	20/1	5	TOILET ROOMS
5	-----	-----	500	G	20/1	1	DRINKING FTN.
7	180	-----	-----	R	20/1	1	STORAGE
9	-----	360	-----	R	20/1	2	STORAGE
11	-----	-----	180	R	20/1	1	TELEPHONE BKBD
13	180	-----	-----	R	20/1	1	ELECTRIC ROOM
15	-----	50	-----	G	20/1	1	MOTOR DOOR
17	-----	-----			20/1		SPARE
19		-----	-----		20/1		SPARE
21	-----		-----		20/1		SPARE
23	-----	-----			20/1		SPARE
25		-----	-----		20/1		SPARE
27	-----		-----		20/1		SPARE
29	-----	-----			20/1		SPARE
31		-----	-----		20/1		SPARE
33	-----		-----		20/1		SPARE
35	-----	-----			20/1		SPARE
37		-----	-----		20/1		SPARE
39	-----		-----		20/1		SPARE
41	-----	-----			20/1		SPARE

CKT	A	B	C	TYPE	BKR	QUAN	DESCRIPTION
A 2	720	-----	-----	R	20/1	4	COMMUNITY CENTER
B 4	-----	540	-----		20/1	3	COMMUNITY CENTER
C 6	-----	-----	360		20/1	2	GYM
A 8	540	-----	-----		20/1	3	GYM
B 10	-----	500	-----	G	20/1	1	FACP
C 12	-----	-----	500	G	20/1	1	INTRUSION
A 14	1000	-----	-----	G	20/1	1	MDF
B 16	-----	1000	-----	G	20/1	1	MDF
C 18	-----	-----	1000	G	20/1	1	PUBLIC ADDRESS
A 20	360	-----	-----	R	20/1	2	ELECTRIC ROOM
B 22	-----	2400	-----	G	30/2	1	WH-1 STAFF
C 24	-----	-----	2400	G	--	-----	-----
A 26	1700	-----	-----	G	20/1	1	WH-3 TOILETS
B 28	-----	1700	-----	G	--	-	-----
C 30	-----	-----			20/1		PROVISION
A 32		-----	-----		20/1		PROVISION
B 34	-----		-----		20/1		PROVISION
C 36	-----	-----			20/1		PROVISION
A 38		-----	-----		20/1		PROVISION
B 40	-----		-----		20/1		PROVISION
C 42	-----	-----			20/1		PROVISION

CONNECTED: VA AMPS
PHASE A = 5040 42
PHASE B = 7450 62
PHASE C = 4940 41
TOTAL = 17430 48

L.C.L. @ 125% = 3240
RECEPT. ( ) 10 kVA @ 50% =
KITCHEN @ 65% =
OTHER LOAD @ 100% = 14190
TOTAL VA = 17430
TOTAL AMPS = 48

LOAD TYPES:
G - GENERAL (100%) M - MOTOR (100%)
L - L.C.L. (125%) M1 - MOTOR (125%)
R - RECEPTACLE (50%) X - X-RAY (100%)
(10 kVA @ 100%) X1 - X-RAY (50%)
K - KITCHEN (65%)



UFER GROUND BUILDING

SCALE: NONE — 3

LOAD SUMMARY	
LIGHTING	10KW
HVAC	135KW
RECEPTACLES	40KW
TOTAL	185KW (515A@208V)

FEEDER CALCULATIONS

FEEDER ID	COPPER CONDUCTORS PER PHASE	LENGTH IN FEET	FAULT CURRENT IN AMPS AT END OF FEEDER*
MSB-1	1-1AWG	65	12709
MSB-2	1-1/0AWG	70	13916
MSB-3	1-1/0AWG	70	13916
MSB-4	2-350MCM	125	25447
M-1	1-8AWG	30	6466
M-2	1-8AWG	30	6466
M-3	1-4AWG	45	8650
M-4	1-4AWG	70	6650
M-5	1-4AWG	100	5358
M-6	1-4AWG	70	6650
M-7	1-4AWG	70	6650
M-8	1-4AWG	100	5358
M-9	1-4AWG	25	11983
M-10	1-8AWG	70	3922

*assumes utility contribution 65KA plus 380FLA motor load

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BID SET 06.03.25

⚠1 ELECTRICAL PLAN CHECK RESPONSE
⚠2 SECOND ELECTRICAL PLAN CHECK RESPONCE

REGISTERED PROFESSIONAL ENGINEER — STEPHEN R. ZACHARY — No. E 10372 — Exp. 09-30-26 — ELECTRICAL — STATE OF CALIFORNIA
06/06/2025
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SINGLE LINE DIAGRAMS

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E0.2

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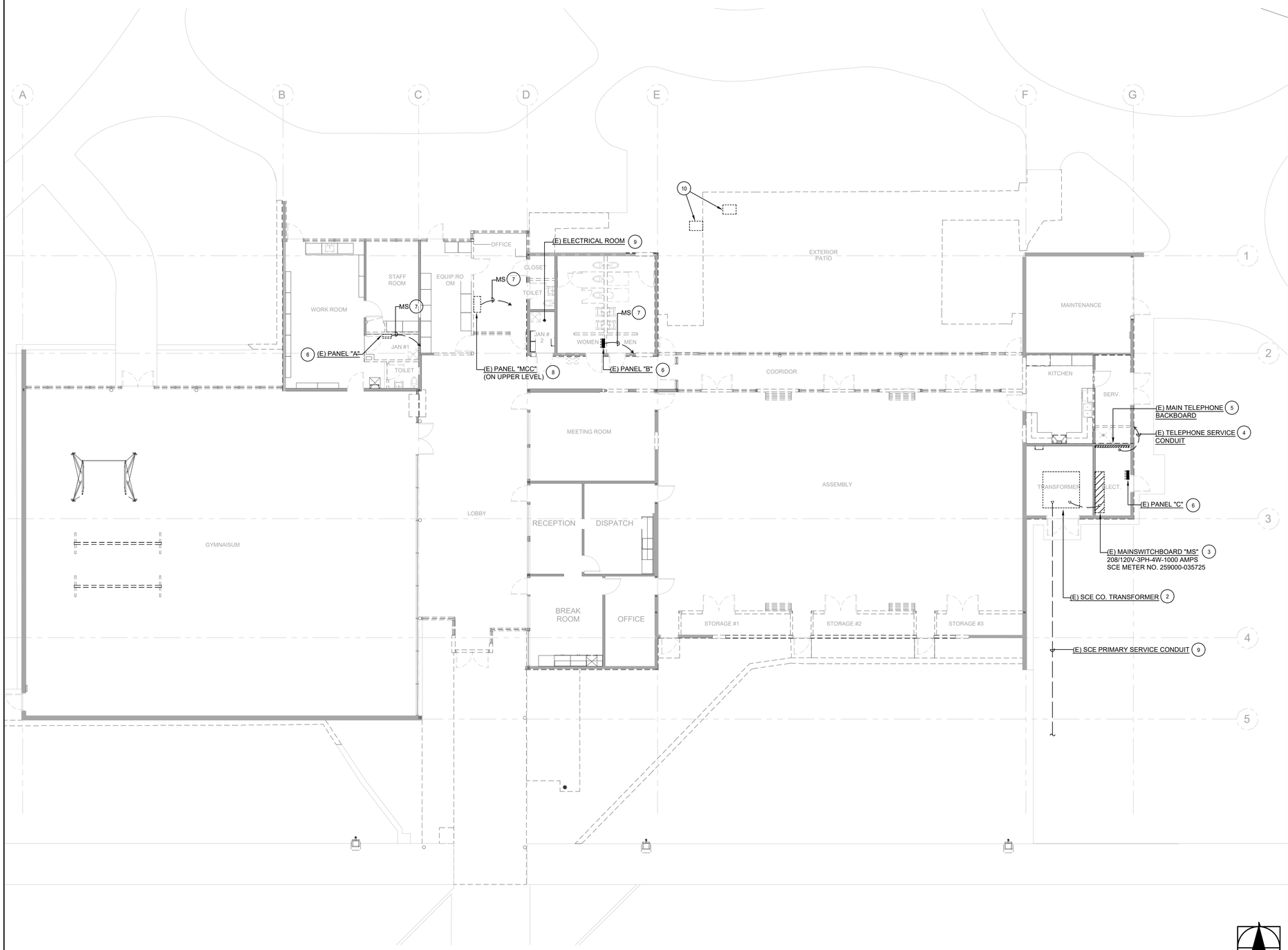

ELECTRICAL DEMOLITION PLAN | SCALE: 1/8" = 1'-0" | 1

REFERENCE NOTES:

1. EXISTING SCE CO. PRIMARY SERVICE UNDERGROUND CONDUIT TO REMAIN AND BE PROTECTED IN PLACE. VERIFY EXACT LOCATION.
2. EXISTING PAD TO REMAIN. PROTECT IN PLACE.
3. DISCONNECT AND REMOVE EXISTING MAIN SWITCHBOARD. COORDINATE WITH SCE CO. AND DISCONNECT AND REMOVE EXISTING SCE SECONDARY SERVICE CONDUCTORS.
4. EXISTING 2"C. BELOW GRADE FOR MAIN TELEPHONE SERVICE TO REMAIN. PROTECT IN PLACE. VERIFY EXACT LOCATION.
5. REMOVE ALL TELEPHONE WIRING EXCEPT MAIN UTILITY CO. TERMINAL.
6. DISCONNET AND REMOVE EXISTING PANEL AND ALL CONDUITS AND WIRE CONNECTED TO IT.
7. DISCONNECT AND REMOVE EXISTING UNDERGROUND POWER FEEDER. CUT CONDUITS FLUSH WITH GRADE. REMOVE ABOVE GRADE CONDUITS. ABANDON UNDERGROUND CONDUITS.
8. DISCONNECT AND REMOVE EXISTING DISTRIBUTION PANEL AND ALL LOAD SIDE CONNECTIONS TO HVAC EQUIPMENT.
9. DISCONNECT AND REMOVE EXISTING EQUIPMENT IN ELECTRICAL ROOM INCLUDING EMERGENCY LIGHTING INVERTER.
10. EXISTING PULLBOXES TO BE ADJUSTED/RELOCATED.

GENERAL ELECTRICAL DEMOLITION NOTES

1. CONTACT SCE CO. AND COORDINATE DISCONNECTION OF THE EXISTING MAIN SWITCHBOARD.
2. DISCONNECT AND REMOVE EXISTING MAIN SWITCHBOARD, PANELS, MOTOR CONTROL CENTERS, AND RELATED FEEDERS.
3. DISCONNECT AND REMOVE EXISTING INTERIOR LIGHT FIXTURES AND RELATED WALL SWITCHES, COVER PLATES, AND CONTROL SYSTEMS.
4. DISCONNECT AND REMOVE EXISTING BUILDING MOUNTED EXTERIOR LIGHT FIXTURES AND RELATED TIMESWITCHES, RELAYS, PHOTOCELLS, AND CONTROLS.
5. DISCONNECT AND REMOVE ELECTRICAL CONNECTIONS TO HEATING, VENTILATION AND AIR-CONDITIONING EQUIPMENT. DISCONNECT AND REMOVE EXISTING FUSED SWITCHES, ENCLOSED CIRCUIT BREAKERS, CONTROL TRANSFORMERS, AND FEEDER WIRING.
6. DISCONNECT AND REMOVE EXISTING ELECTRICAL CONNECTIONS TO WATER HEATERS, PUMPS, AND DRINKING FOUNTAINS INCLUDING DISCONNECT SWITCHES AND CONTROLS.
7. DISCONNECT AND REMOVE EXISTING DUPLEX RECEPTACLES AND COVER PLATES.
8. DISCONNECT AND REMOVE HARDWIRED CONNECTIONS TO FOODSERVICE EQUIPMENT.
9. DISCONNECT AND REMOVE EXISTING BRANCH CIRCUIT WIRING.
10. DISCONNECT AND REMOVE EXISTING CONDUITS ABOVE GRADE WHICH ARE EXPOSED TO VIEW NAD/OR IN CONFLICT WITH NEW CONSTRUCTION.

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ELECTRICAL DEMOLITION PLAN

SHEET
E2.0

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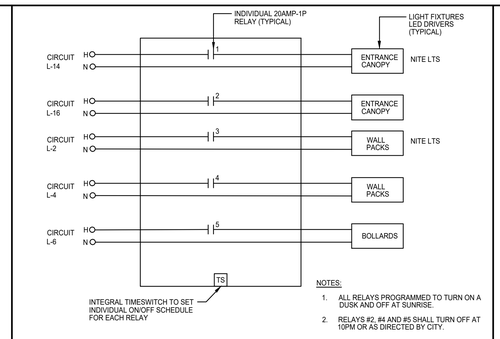
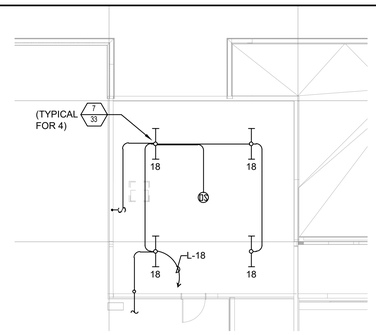


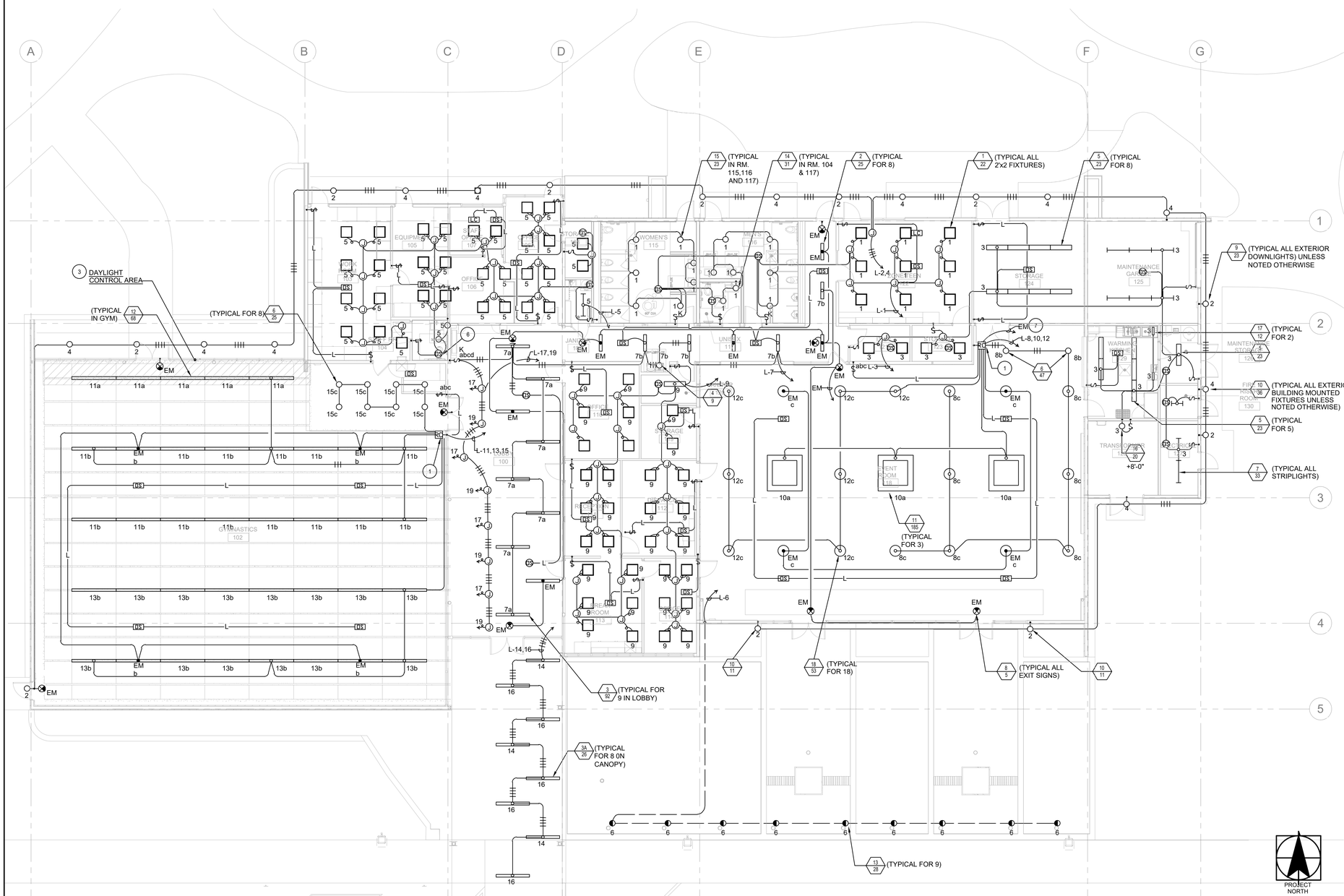
EXTERIOR LIGHTING CONTROL PANEL LCP | SCALE: NONE | 3



MEZZANINE LIGHTING PLAN | SCALE: 1/8" = 1'-0" | 2

REFERENCE NOTES:

1. LIGHTING CONTROL PANEL MOUNTED ON WALL AT +8' AND PAINTED TO MATCH WALL COLOR.
2. UP TO ROOF LEVEL. SEE SHEET E3.1.
3. LIGHTS WITHIN HATCHED AREA SHALL AUTOMATICALLY DIM IN RESPONSE TO NATURAL LIGHT ENTERING THE ROOM.
4. CONNECT TO ILLUMINATED SKYLIGHT PANEL. SEE ARCHITECTURAL DRAWINGS.
5. MOUNT AT +12" ABOVE TO P OF SIGN.
6. CONNECT EXHAUST FAN TO ROOM OCCUPANCY SENSOR FOR CONTROL. SEE NOTE 11 SHEET E2.2.
7. 6#10,1#10 GROUND - 3/4"C.



LIGHTING PLAN | SCALE: 1/8" = 1'-0" | 1

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CHECK	**Checker**

LIGHTING PLAN

SHEET
E2.1

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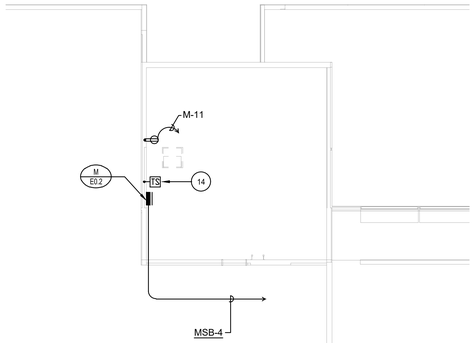
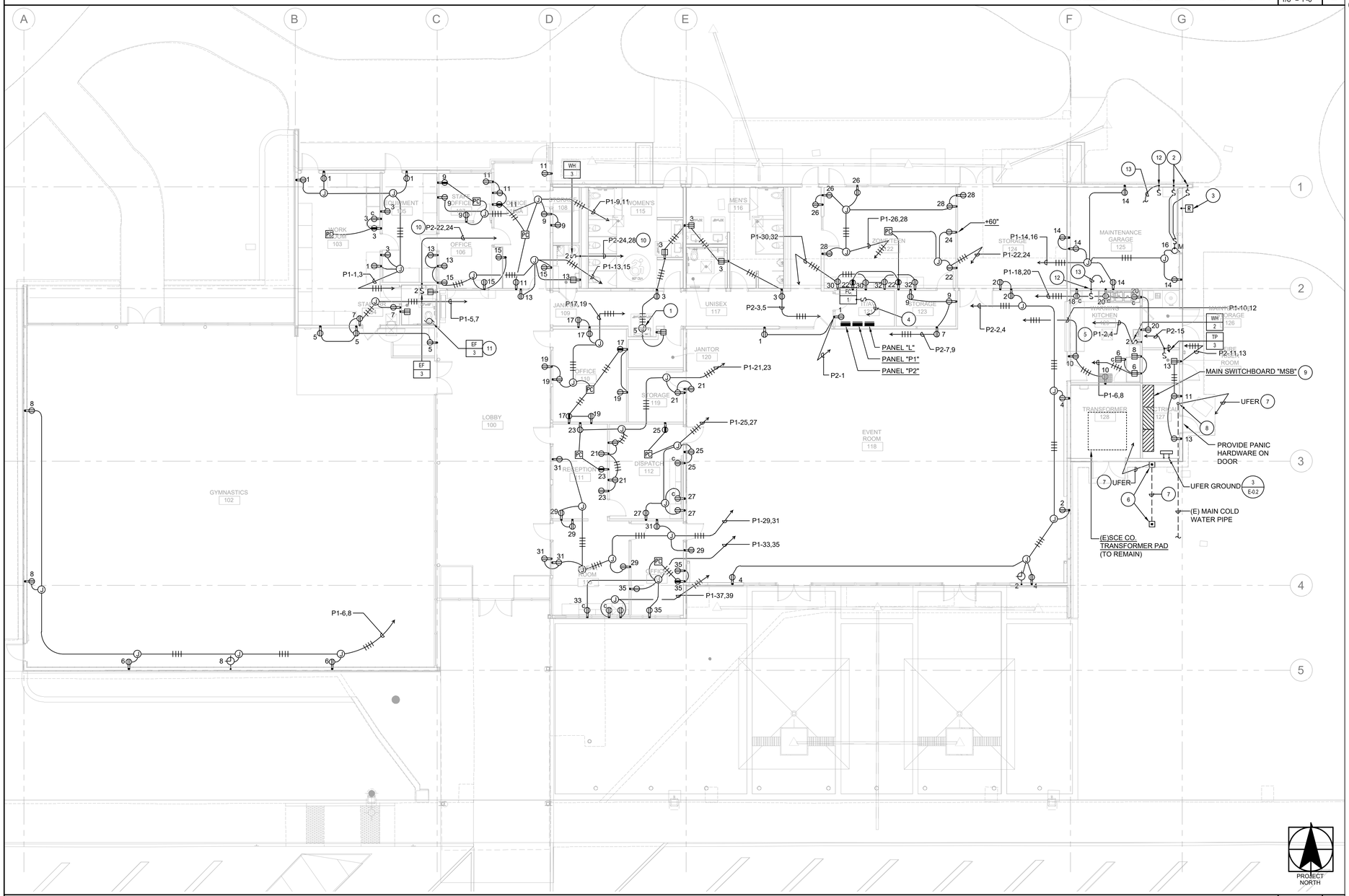


MEZZANINE LEVEL POWER PLAN | SCALE: 1/8" = 1'-0" | 2



POWER PLAN | SCALE: 1/8" = 1'-0" | 1

REFERENCE NOTES:

1. CONNECT TO DRINKING FOUNTAIN.
2. INSTALL AND CONNECT SWITCHES FURNISHED WITH MOTOR DOOR AT +45".
3. INSTALL AND CONNECT WIRELESS RECEIVER FURNISHED WITH DOOR AT +10" ABOVE DOOR.
4. 3/4"C. WITH CABLING TO ROOFTOP HP UNIT. SEE SHEET E3.1.
5. 2#6, 1#6 GROUND - 1"C.
6. 10'L. x 3/4" DIAMETER COPPER CLAD STEEL DRIVEN GROUND ROD WITH CONCRETE PULL BOX ON TOP FLUSH WITH GRADE.
7. 1#3/0 COPPER GROUND IN 1" PVC SHEDULE 40 CONDUIT.
8. BOND TO MAIN COLD WATER PIPE WITHIN 5-FEET OF WHERE PIPE ENTERS BUILDING.
9. ALIGN UNDERGROUND PULL SECTION OF NEW SWITCHBOARD WITH EXISTING SCE CO. SECONDARY SERVICE CONDUITS FROM TRANSFORMER.
10. 2#10, 1#10 GROUND – 3/4"C.
11. PROVIDE 2#12, 1#12 GROUND-3/4"C. FROM FAN TO LINE VOLTAGE OCCUPANCY SENSOR IN RESTROOM SO FAN TURNS ON AND OFF WITH MOTION SENSOR.
12. ENGRAVE WALL SWITCH "EXHAUST FAN".
13. UP TO ROOFTOP EXHAUST FAN. SEE SHEET E3.1.
14. TIMESWITCH AND CONTACTOR FOR CONTROL OF ROOF EXHAUST FANS. SEE NOTE 17 SHEET E0.2.

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POWER PLAN

SHEET
E2.2

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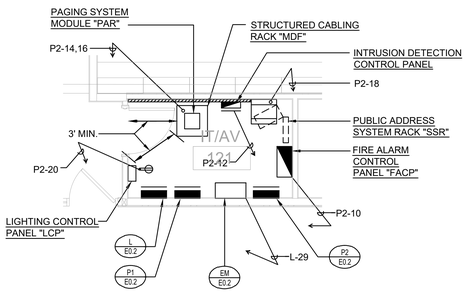
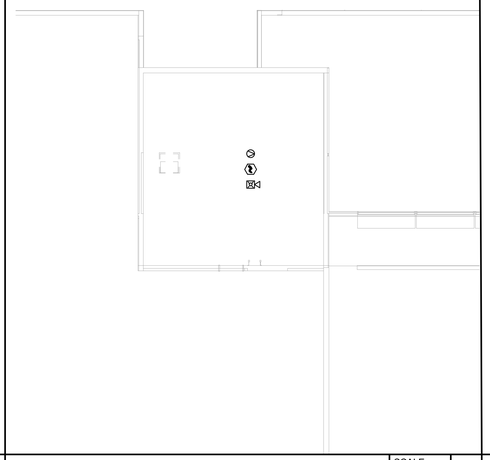
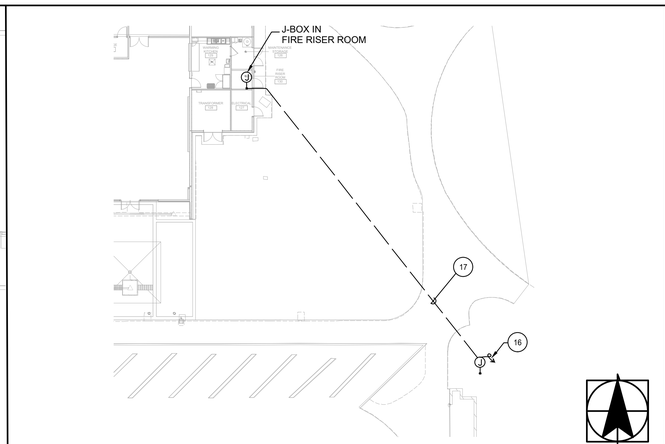


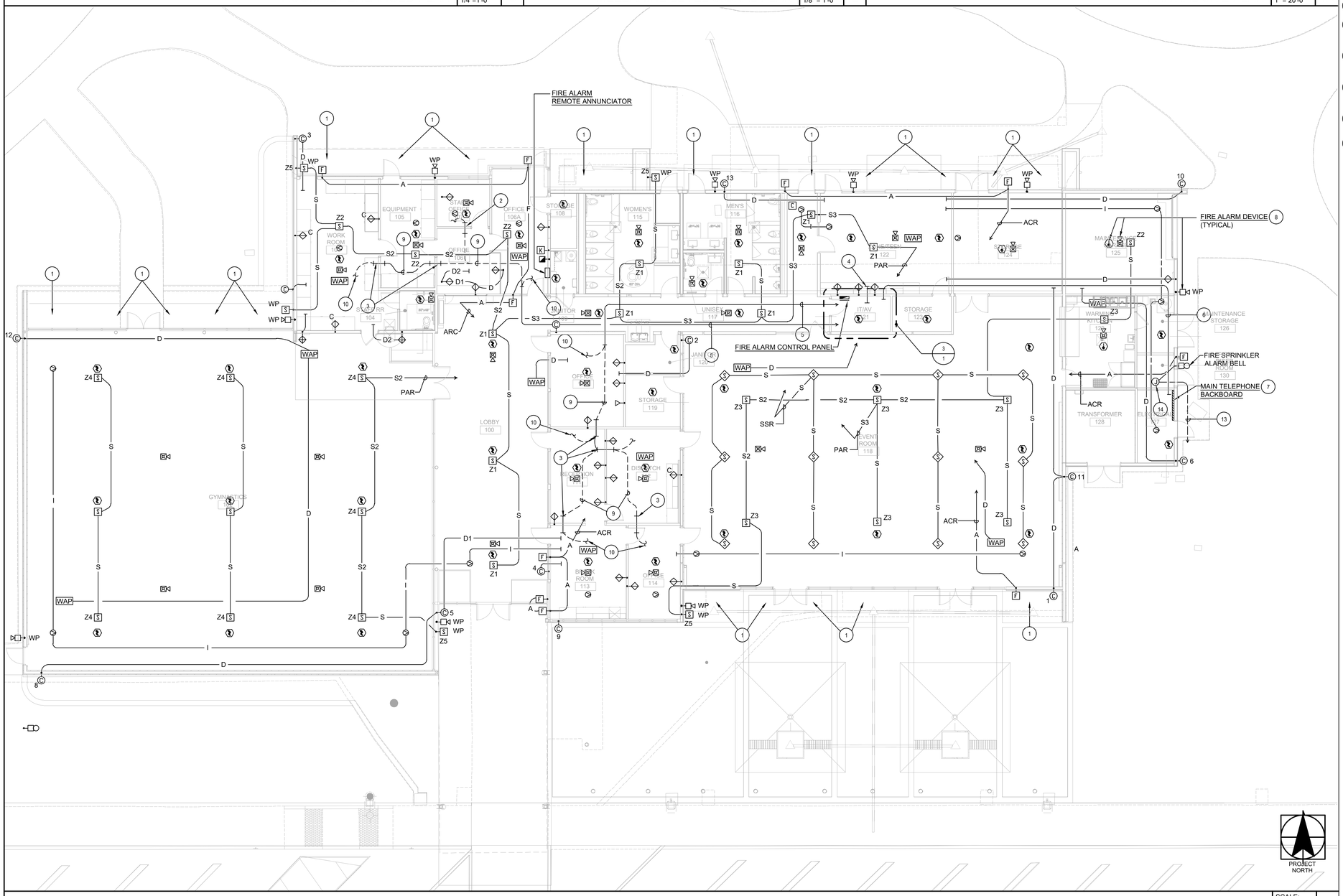
ROOM 121 ENLARGED PLAN | SCALE: 1/4"=1'-0" | 3



MEZZANINE LEVEL SIGNAL PLAN | SCALE: 1/8" = 1'-0" | 2



PARTIAL SITE PLAN | SCALE: 1" = 20'-0" | 1A



SIGNAL PLAN | SCALE: 1/8" = 1'-0" | 1

REFERENCE NOTES:

1. HEAT DETECTOR LOCATED IN SOFFIT WITH ACCESS PANEL BELOW.
2. PROVIDE THE FOLLOWING CONDUITS STUBBED BETWEEN ACCESSIBLE CEILING SPACES FOR LOW VOLTAGE CABLING: 3/4"C. (INTRUSION DETECTION) 1"C. (STRUCTURED CABLING / COMPUTER)
3. PROVIDE THE FOLLOWING CONDUITS STUBBED BETWEEN ACCESSIBLE CEILING SPACES FOR LOW VOLTAGE CABLING: 3/4"C. (INTRUSION DETECTION) 1.5"C. (STRUCTURED CABLING / COMPUTER)
4. PROVIDE THE FOLLOWING CONDUIT HOMERUNS FOR LOW VOLTAGE CABLING TO RESPECTIVE TERMINALS IN ROOM 121: 3/4"C. (INTRUSION DETECTION) 1.5"C. (STRUCTURED CABLING / COMPUTER)
5. PROVIDE THE FOLLOWING CONDUIT HOMERUNS FOR LOW VOLTAGE CABLING TO RESPECTIVE TERMINALS IN ROOM 121: 1"C. (INTRUSION DETECTION) 3"C. (STRUCTURED CABLING / COMPUTER)
6. 3"C.O. FOR TELEPHONE / DATA CABLING FROM BUILDING TELEPHONE DEMARCATION TO NEW MDF IN ROOM 121.
7. PROVIDE 6'W. x 8'H. x 3/4" PLYWOOD BACKBOARD PAINTED WHITE.
8. PROVIDE COMPLETE FIRE ALARM AND DETECTION SYSTEM, INCLUDING OUTLET BOXES, CONDUITS AND CABLING AS A DESIGN-BUILT PROJECT PER SPECIFICATIONS.
9. APPROXIMATE LOCATION OF DATA AND INTRUSION CABLING SUSPENDED ABOVE CEILING. COORDINATE EXACT LOCATION WITH HVAC DUCTWORK AND PLUMBING.
10. PROVIDE DATA AND INTRUSION SYSTEM CABLING ABOVE CEILING TO COMPUTER AND INTRUSION OUTLETS AS SHOWN.
11. 6'X8'X3/4" PLYWOOD, SANDED ON ROOM SIDE, PRIME PAINTED TWO (2) COATS WHITE.
12. RACK-MOUNTED IN "MDF".
13. 3/4"C. WITH FIRE ALARM WIRING TO TAMPER SWITCHES ON BACKFLOW PREVENTER CHECK AND POST INDICATOR VALVES. SEE CIVIL DRAWINGS AND PLAN 1A THIS SHEET.
14. PROVIDE FIRE ALARM ADDRESSABLE MONITOR MODULES CONNECTED TO FLOW AND TAMPER SWITCHES ON FIRE SPRINKLER RISER.
15. INSTALL AND CONNECT AT +8'. COORDINATE WITH FIRE PROTECTION CONTRACTOR REGARDING BELL VOLTAGES SO THAT BELL IS POWERED FROM FIRE ALARM CONTROL PANEL.
16. CONNECT TO TAMPER SWITCHES ON DOUBLE CHECK DETECTOR ASSEMBLY ON FIRE WATER SERVICE.
17. 2#10 - 3/4"C.

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1 ELECTRICAL PLAN CHECK RESPONSE

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06/06/2025
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CHECK	Checker

SIGNAL PLAN

SHEET
E2.3

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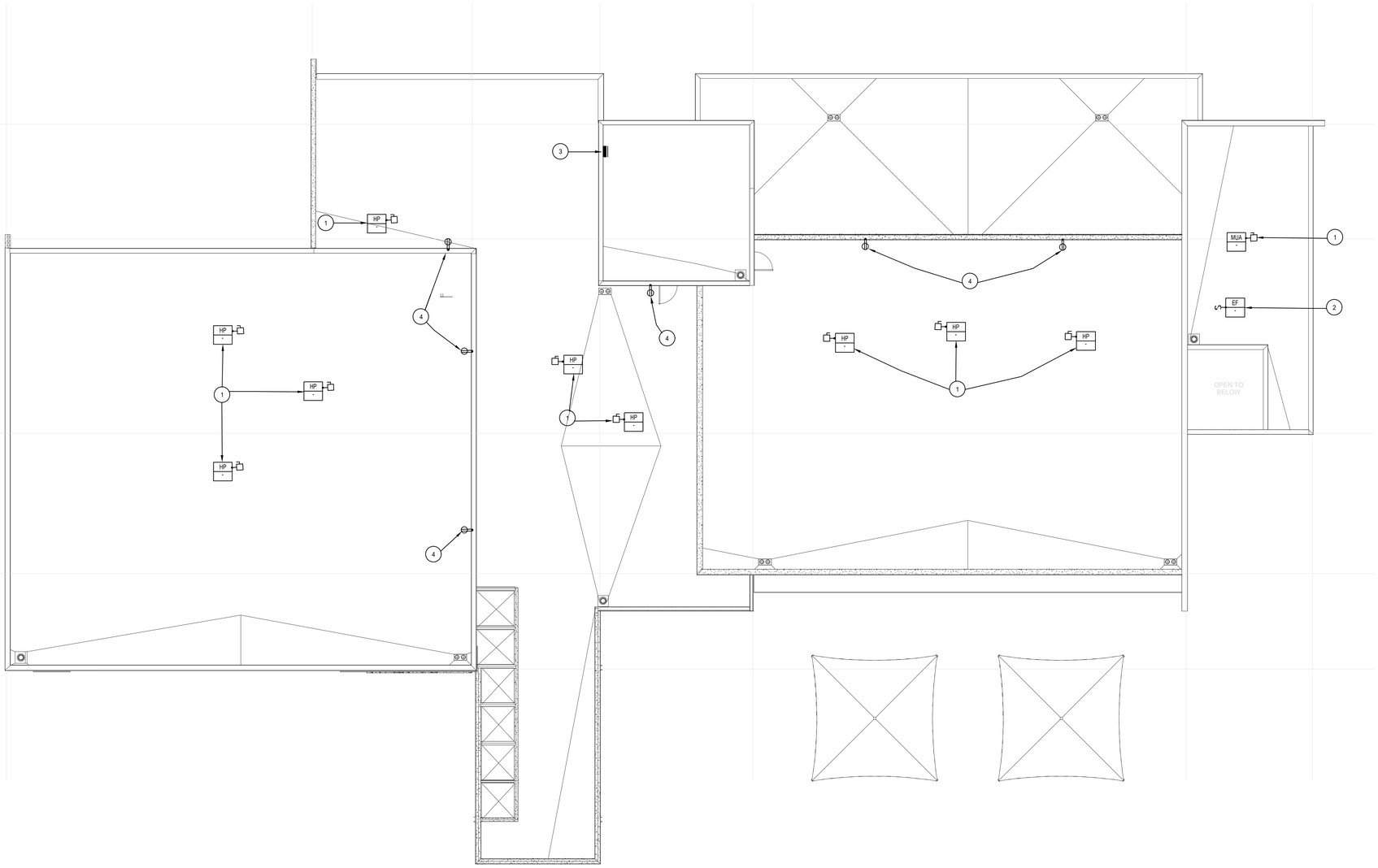

REFERENCE NOTES:

1. DISCONNECT AND REMOVE LINE AND LOW VOLTAGE ELECTRICAL CONNECTIONS TO EXISTING HVAC EQUIPMENT INCLUDING CONDUITS, BOXES, SWITCHES, AND CONDUCTORS.
2. DISCONNECT AND REMOVE LINE AND LOW VOLTAGE ELECTRICAL CONNECTIONS TO EXISTING EXHAUST FAN INCLUDING CONDUITS, BOXES, SWITCHES, AND CONDUCTORS.
3. DISCONNECT AND REMOVE EXISTING PANEL "D" AND ALL CONDUIT AND WIRES CONNECTED TO PANEL.
4. DISCONNECT AND REMOVE EXISTING CONVENIENCE RECEPTACLE INCLUDING CONDUITS, BOXES, AND WIRES.

PROJECT NORTH

ROOF PLAN | SCALE: 1/8" = 1'-0" | 1

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ROOF ELECTRICAL DEMOLITION PLAN

SHEET
E3.0

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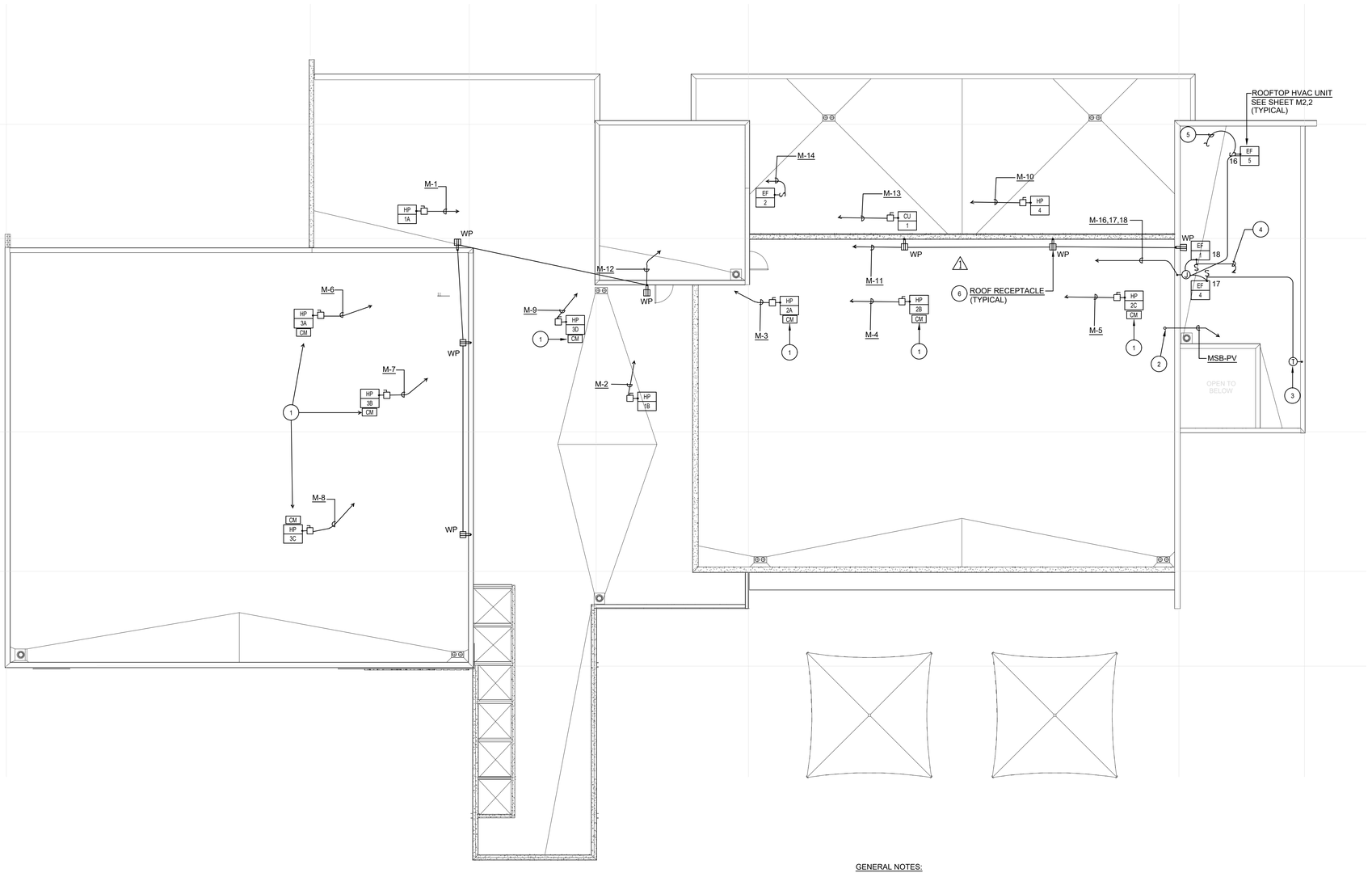

GENERAL NOTES:

1. ALL ROOFTOP ELECTRICAL CONSTRUCTION AND EQUIPMENT SHALL BE WEATHERPROOF.
2. ALL CONDUITS SHALL RUN THROUGH CEILING SPACE OF FLOOR BELOW ROOF.
3. ALL CONDUIT PENETRATIONS THROUGH ROOF SHALL BE COORDINATED WITH ROOF INSTALLER.
4. CONDUITS AT HVAC UNITS SHALL STUB-UP DIRECTLY BELOW FUSED SAFETY SWITCH, SO AS TO NOT BLOCK WORKING CLEARANCES AND AVOID EXCESSIVE USE OF FLEXIBLE CONDUIT. COORDINATE LOCATION OF SAFETY SWITCH WITH HVAC INSTALLER PRIOR TO ROUGH-IN.

PROJECT NORTH

ROOF PLAN | SCALE: 1/8" = 1'-0" | 1

REFERENCE NOTES:

1. PROVIDE FIRE ALARM CONTROL MODULE IN WEATHERPROOF OUTLET BOX AND CONNECT TO SHUTDOWN TERMINALS ON HVAC UNIT, SO ALL AIR MOVEMENT STOPS WHEN SMOKE IS DETECTED IN ROOM SERVED BY HVAC UNIT. PROVIDE CONDUIT DOWN THROUGH ROOF TO FIRE ALARM SLC IN ROOM BELOW.
2. STUB AT +6" FOR A FUTURE PV SYSTEM.
3. INSTALL AND CONNECT LINE VOLTAGE THERMOSTAT IN ELECTRICAL ROOM BELOW FOR CONTROL OF EXHAUST FAN.
4. DOWN TO WALL SWITCH IN BANQUET ROOM. SEE SHEET E2.2.
5. DOWN TO WALL SWITCH IN STORAGE ROOM BELOW. SEE SHEET E2.2.
6. RECEPTACLES ON ROOF SHALL BE WEATHER RESISTANT TYPE AND EQUIPMENT WITH AN "EXTRADUTY" RATED COVER. RECEPTACLES SHALL BE GFCI TYPE.

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12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

1 ELECTRICAL PLAN CHECK RESPONSE

REGISTERED PROFESSIONAL ENGINEER
STEPHEN R. ZALTEN
No. E 10372
Exp. 09-30-26
ELECTRICAL
STATE OF CALIFORNIA
06/06/2025

SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

ROOF ELECTRICAL PLAN

SHEET
E3.1

FBA Engineering / Plot Date: 6/6/2025 10:03 AM / Plotted by: Blake Meech / Drawing Location: I:\1197\003\CLEAN SET\E3.1_ROOF ELECTRICAL PLAN_1197.003.dwg
3/4/2023 12:58:15 PM

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	Palms Park Community Center	Report Page:	(Page 1 of 8)
Project Address:	12305 207th Street	Date Prepared:	9/18/2023

This document is used to demonstrate compliance with requirements in 110.9, 110.12(c), 130.0, 130.1, 140.6 and 141.0(b)2 for indoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in 160.5, 170.2(e) and 180.2(b)4 for indoor lighting scopes using the prescriptive path for multifamily occupancies. Multifamily includes dormitory and senior living facilities.

A. GENERAL INFORMATION

01	Project Location (city)	Lakewood	04	Total Conditioned Floor Area (ft²)	15,020
02	Climate Zone	8	05	Total Unconditioned Floor Area (ft²)	0
03	Occupancy Types Within Project (select all that apply):		06	# of Stories (Habitable Above Grade)	1

● Office ● Support Areas ● Warehouse ● All Other Occupancies

B. PROJECT SCOPE

This table includes any lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.6 / 170.2(e) or 141.0(b)2 / 180.2(b)4 for alterations.

Scope of Work	Conditioned Spaces		Unconditioned Spaces	
01	02	03	04	05
My Project Consists of (check all that apply):	Calculation Method	Area (ft²)	Calculation Method	Area (ft²)
☒ New Lighting System	Area Category Method	15020	Area Category Method	0
☐ New Lighting System - Parking Garage				
Total Area of Work (ft²)	15020		0	

STATE OF CALIFORNIA
Indoor Lighting
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CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
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C. COMPLIANCE RESULTS

If any cell on this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D. for guidance.

Lighting in conditioned and unconditioned spaces must not be combined for compliance per 140.6(b)1 / 170.2(e)	Allowed Lighting Power per 140.6(b) / 170.2(e) (Watts)						Adjusted Lighting Power per 140.6(a) / 170.2(e) (Watts)				Compliance Results
	01	02	03	04		05	06	07 Adjustments		08	09
	Complete Building 140.6(c)1	Area Category 140.6(c)2 / 170.2(e)4	Area Category Additional 140.6(c)2G / 170.2(e)4Av (+)	Tailored 140.6(c)3 / 170.2(e)4B (+)	=	**Total Allowed** (Watts)	≥ Total Designed (Watts)	PAF Lighting Control Credits 140.6(a)2 / 170.2(e)1B (-)	=	**Total Adjusted** (Watts) *Includes Adjustments	**05 must be >= 08 140.6 / 170.2(e)**
	(See Table I)	(See Table I)	(See Table J)	(See Table K)			(See Table F)	(See Table P)			
Conditioned		10,199.7	0		=	10,200	≥ 10,013	0	=	10013	COMPLIES
Unconditioned					=		≥		=		
Controls Compliance (See Table H for Details)											COMPLIES
Rated Power Reduction Compliance (See Table Q for Details)											

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

Generated Date/Time:
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
Report Version: 2022.0.000
Schema Version: rev 20220101
Documentation Software: EnergyPro
Compliance ID: EnergyPro-7526-0923-0600
Report Generated: 2023-09-18 14:13:00

STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	Palms Park Community Center	Report Page:	(Page 3 of 8)
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F. INDOOR LIGHTING FIXTURE SCHEDULE

This table includes all planned permanent and portable lighting other than dwelling unit/ hotel/ motel room lighting. Multifamily dwelling unit and hotel/motel room lighting is documented in Table T. If using Table T to document lighting in multifamily common use areas providing shared provisions for living, eating, cooking or sanitation, those luminaires are not included here.

Designed Wattage: Conditioned Spaces

01	02	03	04	05	06	07	08	09	10	
									Field Inspector	
Name or Item Tag	Complete Luminaire Description	Modular (Track) Fixture	Small Aperture & Color Change[1]	Watts per luminaire[2]	How is Wattage determined	Total Number of Luminaires	Excluded per 140.6(a)3 / 170.2(e)2C	Design Watts	Pass	Fail
1	TYPE 1 LED 2 X 2	No	NA	22	Mfr. Spec	74	No	1,628	☐	☐
11	TYPE 11 LED 2X8L	No	NA	185	Mfr. Spec	3	No	555	☐	☐
12	TYPE 12 LED 2X8L	No	NA	68	Mfr. Spec	45	No	3,060	☐	☐
15	TYPE 15 LED DOWNLIGHT	No	NA	19	Mfr. Spec	15	No	285	☐	☐
2	TYPE 2 LED 3' LINEAR	No	NA	25	Mfr. Spec	16	No	400	☐	☐
3	TYPE 3 LED 6' LINEAR	No	NA	92	Mfr. Spec	9	No	828	☐	☐
5	TYPE 5 1X4 LED	No	NA	23	Mfr. Spec	16	No	368	☐	☐
6	TYPE 6 LED DOWNLIGHT	No	NA	72	Mfr. Spec	36	No	2,592	☐	☐
7	TYPE 7 LED STRIP LIGHT	No	NA	33	Mfr. Spec	9	No	297	☐	☐
							Total Designed Watts: CONDITIONED SPACES	10,013		

[1] *FOOTNOTE: Design Watts for small aperture and color changing luminaires which qualify per 140.6(a)4B / 170.2(e)2D is adjusted to be 75% /80% of their rated wattage. Table F automatically makes this adjustment, the permit applicant should enter full rated wattage in column 05.*

[2] *Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per 130.0(c) / 160.5(b). Wattage used must be the maximum rated for the luminaire, not the lamp.*

G. MODULAR LIGHTING SYSTEMS

This section does not apply to this project.

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STATE OF CALIFORNIA
Indoor Lighting
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H. INDOOR LIGHTING CONTROLS (Not including PAFs)

This table includes lighting controls for conditioned and unconditioned spaces.

Building Level Controls

01	02	03	
		Field Inspector	
Mandatory Demand Response 110.12(c)	Shut-off controls 130.1(c) / 160.5(b)4C	Pass	Fail
Required >= 4,000W subject to multilevel	See Area/Space Level Controls	☐	☐

Area Level Controls

04	05	06	07	08	09	10	11	12	
								Field Inspector	
Area Description	Complete Building or Area Category Primary Function Area	Manual Area Controls 130.1(a) / 160.5(b)4A	Multi-Level Controls 130.1(b) / 160.5(b)4B	Shut-Off Controls 130.1(c) // 160.5(b)4C	Primary/Skylit Daylighting 130.1(d) / 160.5(b)4D	Secondary Daylighting 130.1(d) / 160.5(b)4D	Interlocked Systems 140.6(a)1/ 170.2(e)2A	Pass	Fail
ASSEMBLY BUILDING	All Other Space Types	Readily Accessible	Dimmer	Occupancy Sensor	Included	Included	No	☐	☐
					13				
					Plan Sheet Showing Daylit Zones:				

I. LIGHTING POWER ALLOWANCE: COMPLETE BUILDING OR AREA CATEGORY METHODS

Each area complying using the Complete Building or Area Category Methods per 140.6(b) are included in this table. Column 06 indicates if additional lighting power allowances per 140.6(c) or adjustments per 140.6(a) are being used .

Conditioned Spaces

01	02	03	04	05	06	
					Additional Allowance / Adjustment	
Area Description	Complete Building or Area Category Primary Function Area	Allowed Density (W/ft²)	Area (ft²)	Allowed Wattage (Watts)	Area Category	PAF
Offices > 250 sq ft	Office (>250 square feet)	0.6	1,260	756	No	No

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STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

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J. ADDITIONAL ALLOWANCE: AREA CATEGORY METHOD QUALIFYING LIGHTING SYSTEM

This section does not apply to this project.

K. TAILORED METHOD GENERAL LIGHTING POWER ALLOWANCE

This section does not apply to this project.

L. ADDITIONAL LIGHTING ALLOWANCE: TAILORED WALL DISPLAY

This section does not apply to this project.

M. ADDITIONAL LIGHTING ALLOWANCE: TAILORED FLOOR AND TASK LIGHTING

This section does not apply to this project.

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N. ADDITIONAL LIGHTING ALLOWANCE: TAILORED DECORATIVE /SPECIAL EFFECTS

This section does not apply to this project.

O. ADDITIONAL LIGHTING ALLOWANCE: TAILORED VERY VALUABLE MERCHANDISE

This section does not apply to this project.

P. POWER ADJUSTMENT: LIGHTING CONTROL CREDIT (POWER ADJUSTMENT FACTOR (PAF))

This section does not apply to this project.

Q. RATED POWER REDUCTION COMPLIANCE FOR ONE-FOR-ONE ALTERATIONS

This section does not apply to this project.

R. 80% LIGHTING POWER FOR ALL ALTERATIONS - CONTROLS EXCEPTIONS

This section does not apply to this project.

S. DAYLIGHT DESIGN POWER ADJUSTMENT FACTOR (PAF)

This section does not apply to this project.

T. DWELLING UNIT LIGHTING

This section does not apply to this project.

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STATE OF CALIFORNIA
Indoor Lighting
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CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	Palms Park Community Center	Report Page:	(Page 7 of 8)
		Date Prepared:	9/18/2023

U. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selections have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-LTI-E - Must be submitted for all buildings

V. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in this document. If any selections have been changed by the permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and any with "-A" in the form name must be completed through an Acceptance Test Technician Certification Provider (ATTCP). For more information visit: http://www.energy.ca.gov/title24/attcp/providers.html

Form/Title	Systems/Spaces To Be Field Verified
NRCA-LTI-02-A - Must be submitted for occupancy sensors and automatic time switch controls.	ASSEMBLY BUILDING;
NRCA-LTI-03-A - Must be submitted for automatic daylight controls.	ASSEMBLY BUILDING;
NRCA-LTI-04-A - Must be submitted for demand responsive lighting controls.	Whole Building Demand Response;

Generated Date/Time:
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STATE OF CALIFORNIA
Indoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-LTI-E
Project Name:	Palms Park Community Center	Report Page:	(Page 8 of 8)
Project Address:	12305 207th Street	Date Prepared:	9/18/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Stephen R. Zajicek P.E.	Documentation Author Signature:
Company: FBA Engineering	Signature Date: 2023-09-18
Address: 150 Paularino Avenue Suite A120	CEA/ HERS Certification Identification (if applicable): E10372
City/State/Zip: Costa Mesa CA 92626	Phone: 9498529995

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Stephen R. Zajicek P.E.	Responsible Designer Signature:
Company: FBA Engineering	Date Signed: 2023-09-18
Address: 150 Paularino Ave. Suite A120	License: E10372
City/State/Zip: Costa Mesa CA 92626	Phone: 949-852-9995

Generated Date/Time:
CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
Report Version: 2022.0.000
Schema Version: rev 20220101
Documentation Software: EnergyPro
Compliance ID: EnergyPro-7526-0923-0600
Report Generated: 2023-09-18 14:13:00

DAHLIN
505 TECHNOLOGY DRIVE, SUITE 200
IRVINE, CALIFORNIA 92618
949-250-4680

CLIENT

FBA Engineering
Consulting Electrical Engineers
150 Paularino Avenue Suite A120
Costa Mesa, CA 92626
949.852.9995 ● 949.852.1657 (fax)
fbaengr.com
FBA Job Number: 1197.003

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715
PW-23-01

BID SET 06.03.25

ELECTRICAL PLAN CHECK RESPONSE

REGISTERED PROFESSIONAL ENGINEER
STEPHEN R. ZAJICEK
No. E 10372
Exp. 09-30-26
ELECTRICAL
STATE OF CALIFORNIA

06/06/2025

SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

TITLE 24 CALCULATIONS

SHEET
E4.1

3/4/2023 12:58:15 PM
FBA Engineering / Plot Date: 6/6/2025 10:03 AM / Plotted by: Blake Meech / Drawing Location: I:\1197\003\CLEAN SET\E4.1_TITLE 24 CALCULATIONS_ 1197.003.dwg

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: Palms Park Community Center	**Report Page:**	**(Page 3 of 7)**
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F. OUTDOOR LIGHTING FIXTURE SCHEDULE

For new or altered lighting systems demonstrating compliance with 140.7 / 170.2(e)6 all new luminaires being installed and any existing luminaires remaining or being moved within the spaces covered by the permit application are included in the Table below. For altered lighting systems using the Existing Power method per 141.0(b)2L only new luminaires being installed and replacement luminaires being installed as part of the project scope are included (ie, existing luminaires remaining or existing luminaires being moved are not included). Outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit are included in Table H. and are not included here. All other multifamily outdoor lighting is included here.

Designed Wattage:

01	02		03	04	05	06	07	08	09	10	
Name or Item Tag	Complete Luminaire Description		Watts per luminaire[1, 2]	How is Wattage determined	Total Number Luminaires[2]	Luminaire Status[3]	Excluded per 140.7(a) / 170.2(e)6A	Design Watts	Cutoff Req. > 6,200 initial lumen output 130.2(b) / 160.5(c)1[4]	Field Inspector	
										Pass	Fail
10	TYPE 10 LED WALL BRACKET-OUTDOOR	☐ Linear	11	Mfr. Spec	8	New	☐	88	NA: < 6200 lumens	☐	☐
13	TYPE 13 LED BOLLARD-OUTDOOR	☐ Linear	28	Mfr. Spec	9	New	☐	252	NA: < 6200 lumens	☐	☐
18	TYPE 18 LED SIGN LIGHTER-OUTDOOR	☐ Linear	30	Mfr. Spec	0	New	☐	0	NA: < 6200 lumens	☐	☐
3A	TYPE 3A LED 6' LINEAR-OUTDOOR	☐ Linear	26	Mfr. Spec	8	New	☐	208	NA: < 6200 lumens	☐	☐
9	TYPE 9 LED DOWNLIGHT-OUTDOOR	☐ Linear	23	Mfr. Spec	14	New	☐	322	NA: < 6200 lumens	☐	☐
								Total Design Watts:	870		

* NOTES: Selections with a * require a note in the space below explaining how compliance is achieved.
EX: Luminaire is lighting a statue; EXCEPTION 2 to 130.2(b)

[1] FOOTNOTES: Authority Having Jurisdiction may ask for Luminaire cut sheets to confirm wattage used for compliance per 130.0(c) / 160.5(b)
[2] For linear luminaires, wattage should be indicated as W/ft instead of Watts/luminaire. Total linear feet should be indicated in column 05 instead of number of luminaires.
[3] Select "New" for new luminaires in a new outdoor lighting project, or for added luminaires in an alteration. Select "Altered" for replacement luminaires in an alteration. Select "Existing to Remain" for existing luminaires within the project scope that are not being altered and are remaining. Select "Existing Reinstalled" for existing luminaires which are being removed and reinstalled as part of the project scope.
[4] Compliance with mandatory shielding requirements is required for luminaires with initial lumen output >= 6,200 unless exempted by 130.2(b)/ 160.5(c)

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: Palms Park Community Center	**Report Page:**	**(Page 2 of 7)**
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C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through N. Note: If any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see applicable Table referenced below.

Calculations of Total Allowed Lighting Power (Watts) 140.7 / 170.2(e)6 or 141.0(b)2L / 180.2(b)4Bv												Compliance Results		
01		02		03		04		05	06			07		08	09
General Hardscape Allowance 140.7(d)1 / 170.2(e)6 (See Table I)	+	Per Application 140.7(d)2 / 170.2(e)6 (See Table J)	+	Sales Frontage 140.7(d)2 (See Table K)	+	Ornamental 140.7(d)2 / 170.2(e)6 (See Table L)	+	Per Specific Area 140.7(d)2 / 170.2(e)6 (See Table M)	OR Existing Power Allowance 141.0(b)2L / 180.2(b)4Bv (See Table N)	=		**Total Allowed** (Watts)	≥	**Total Actual** (Watts)	**07 must be >= 08**
0	+	---	+	---	+	---	+	870	OR ---	=		870	≥	870	COMPLIES
Shielding Compliance (See Table G for Details)															N/A
Controls Compliance (See Table H for Details)															Not applicable

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with unedtable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
Generated Date/Time:
Report Version: 2022.0.000
Schema Version: rev 20220101
Documentation Software: EnergyPro
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Outdoor Lighting
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Project Name: Palms Park Community Center	**Report Page:**	**(Page 1 of 7)**
Project Address: 12305 207th Street	**Date Prepared:**	9/18/2023

This document is used to demonstrate compliance with requirements in 110.9, 130.0, 130.2, 140.7, and 141.0(b)2L for outdoor lighting scopes using the prescriptive path for nonresidential and hotel/motel occupancies. It is also used to document compliance with requirements in 160.5, 170.2(e)6, 180.1(a) and 180.2(b)4Bv for outdoor lighting scopes using the prescriptive path for multifamily and mixed-use occupancies. Multifamily includes dormitory and senior living facilities.

A. GENERAL INFORMATION

01	Project Location (city)	Lakewood	04	Total Illuminated Hardscape Area (ft²)	3107SF
02	Climate Zone	8			
03	Outdoor Lighting Zone per Title 24 Part 1 10.114 or as designated by Authority Having Jurisdiction (AHJ):				
☐	LZ-0: Very Low - Undeveloped Parkland	☒ LZ-2: Moderate - Urban Clusters	☐	LZ-4: High - Must be reviewed by CA Energy Commission for Approval	
☐	LZ-1: Low - Rural Areas	☐ LZ-3: Moderately High - Urban Areas			
05	Occupancy Types within Project				
● Office ● Support Areas ● Warehouse ● All Other Occupancies					

B. PROJECT SCOPE

This table includes outdoor lighting systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.7 / 170.2(e)6 or 141.0(b)2L / 180.2(b)4Bv for alterations.

My Project Consists of:

01	02		
☒ New Lighting System	Must Comply with Allowances from 140.7 / 170.2(e)6		
☐ Altered Lighting System	Is your alteration increasing the connected lighting load (Watts)?	○ Yes	○ No
03	04	05	
% of Existing Luminaires Being Altered[1]	Sum Total of Luminaires Being Added or Altered	Calculation Method	
☐ < 10% ☐ >= 10% and < 50% ☐ >= 50%			

Please proceed to Table F. Outdoor Lighting Fixture Schedule to define the project's luminaires.

[1] FOOTNOTES: % of Existing Luminaires Being Altered = (Sum Total of Luminaires Being Added or Altered / Existing Luminaires within the Scope of the Permit Application) x 100.

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STATE OF CALIFORNIA
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Project Name: Palms Park Community Center	**Report Page:**	**(Page 6 of 7)**
	Date Prepared:	9/18/2023

N. EXISTING CONDITIONS POWER ALLOWANCE (alterations only)

This section does not apply to this project.

O. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection has been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/TItle
NRCI-LTO-E - Must be submitted for all buildings

P. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

There are no NRCA forms required for this project.

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
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STATE OF CALIFORNIA
Outdoor Lighting
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Project Name: Palms Park Community Center	**Report Page:**	**(Page 5 of 7)**
	Date Prepared:	9/18/2023

K. LIGHTING ALLOWANCE: SALES FRONTAGE

This section does not apply to this project.

L. LIGHTING ALLOWANCE: ORNAMENTAL

This section does not apply to this project.

M. LIGHTING ALLOWANCE: PER SPECIFIC AREA

This table includes areas using the wattage allowance per specific area from Table 140.7-B /Table 170.2-S. More than one specific area allowance may be taken in a single project, if applicable. However, multiple specific area allowances may not be taken for the exact same area on the site.

01	02	03	04	05	06	07	08	09	10
		CALCULATED ALLOWANCE (Watts)			DESIGN WATTS				
Area Description	Specific Area Type per Table 140.7-B	Specific Area (ft²)[1]	Allowed Density (W/ft²)	Extra Allowance (Watts)	Luminaire Name or Item Tag	Watts per Luminaire	# of Luminaires	Design Watts	Additional Allowance (Watts)
Site Lighitng	BuildingFacade	9150	0.1	915	3A	26	8	208	870
					9	23	14	322	
					10	11	8	88	
					13	28	9	252	
					18	30	0	0	
							Total Design Watts for this Area:	870	
							Total Allowance (Watts) All Areas:		870

[1] FOOTNOTES: See Table 140.7-B /Table 170.2-S for rules for calculating the specific areas (ft²) for these additional lighting allowances.
[2] For luminaires indicated in Table F as linear, wattage in column 07 is W/ft instead of Watts/luminaire. Total linear feet should be indicated in column 08 instead of number of luminaires.

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
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Report Version: 2022.0.000
Schema Version: rev 20220101
Documentation Software: EnergyPro
Compliance ID: EnergyPro-7526-0923-0599
Report Generated: 2023-09-18 14:12:59

STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: Palms Park Community Center	**Report Page:**	**(Page 4 of 7)**
	Date Prepared:	9/18/2023

G. SHIELDING REQUIREMENTS (BUG)

This section does not apply to this project.

H. OUTDOOR LIGHTING CONTROLS

This table demonstrates compliance with controls requirements for all new or altered luminaires installed as part of the permit application. For alteration projects, luminaires which are existing to remain (ie untouched) and luminaires which are removed and reinstalled (wiring only) do not need to be included in this table even if they are within the spaces covered by the permit application.
Outdoor lighting for nonresidential buildings, parking garages and common service areas in multifamily buildings must be documented separately from outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit

Mandatory Controls for Nonresidential Occupancies, Parking Garages & Common Areas in Multifamily Buildings

01	02	03	04	05	
Area Description	Shut-Off 130.2(c)1 / 160.5(c)	Auto-Schedule 130.2(c)2 / 160.5(c)	Motion Sensor 130.2(c)3 / 160.5(c)	Field Inspector	
				Pass	Fail

[1] FOOTNOTE: Text has been abbreviated, please refer to Table 160.5-A to confirm compliance with the specific light source technologies listed.
[2] Authority having jurisdiction may ask for cutsheets or other documentation to confirm compliance of light source.
[3] Recessed luminaires marked for use in fire-rated installations, and recessed luminaires installed in non-insulated ceilings are excepted from ii and iii.

I. LIGHTING POWER ALLOWANCE (per 140.7 / 170.2(e))

This table includes areas using allowance calculations per 140.7 / 170.2(e). General Hardscape Allowance is per Table 140.7-A/Table 170.2-A while "Use it or lose it" Allowances are per Table 140.7-B /Table 170.2-S. Indicate which allowances are being used to expand sections for user input. Luminaires that qualify for one of the "Use it or lose it" allowances shall not qualify for another "Use it or lose it" allowance.
Outdoor lighting attached to multifamily buildings and controlled from the inside of a dwelling unit are included in Table H. and are not included here. All other multifamily outdoor lighting is included here.

01				
	"Use it or lose it" Allowance (select all that apply) (select all that apply)			
☐ General Hardscape Allowance Table I (below)	☐ Per Application Table J	☐ Sales Frontage Table K	☐ Ornamental Table L	☒ Per Specific Area Table M

J. LIGHTING ALLOWANCE: PER APPLICATION

This section does not apply to this project.

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
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STATE OF CALIFORNIA
Outdoor Lighting
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-LTO-E
Project Name: Palms Park Community Center	**Report Page:**	**(Page 7 of 7)**
Project Address: 12305 207th Street	**Date Prepared:**	9/18/2023

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Stephen R. Zajicek P.E.	Documentation Author Signature:
Company: FBA Engineering	Signature Date: 2023-09-18
Address: 150 Paularino Avenue Suite A120	CEA/ HERS Certification Identification (if applicable): E10372
City/State/Zip: Costa Mesa CA 92626	Phone: 9498529995

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer).
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Stephen R. Zajicek P.E.	Responsible Designer Signature:
Company: FBA Engineering	Date Signed: 2023-09-18
Address: 150 Paularino Ave. Suite A120	License: E10372
City/State/Zip: Costa Mesa CA 92626	Phone: 949-852-9995

CA Building Energy Efficiency Standards - 2022 Nonresidential Compliance
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FBA Job Number: 1197.003

CONSULTANT

PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715

PW-23-01

BID SET 06.03.25

⚠ ELECTRICAL PLAN CHECK RESPONSE

REGISTERED PROFESSIONAL ENGINEER
STEPHEN R. ZAJICEK
No. E 10372
Exp. 09-30-26
ELECTRICAL
STATE OF CALIFORNIA
06/06/2025

SEAL / SIGNATURE

JOB NO. **1533.006**
DRAWN **Author**
CHECK **Checker**

TITLE 24 CALCULATIONS

SHEET
E4.2

FBA Engineering / Plot Date: 6/6/2025 10:03 AM / Plotted by: Blake Meech / Drawing Location: I:\1197\003\CLEAN SET\E4.2_TITLE 24 CALCULATIONS_1197.003.dwg
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STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ELC-E
This document is used to demonstrate compliance with mandatory requirements in 130.5, for electrical systems in newly constructed nonresidential and hotel/motel occupancies and 160.6 and 160.9 for electrical systems in newly constructed multifamily occupancies. Additions and alterations to electrical service systems in nonresidential and hotel/motel occupancies will also use this document to demonstrate compliance per 141.0(a) or 141.0(b)2P for alterations. For multifamily addition or alterations compliance will be documented per 180.1(a) or 180.2 (b)4Bvii	
Project Name: Palms Park Community Center	**Report Page:** (Page 1 of 4)
Project Address: 12305 207th Street	**Date Prepared:** 5/23/2024

A. GENERAL INFORMATION					
01	Project Location (city)	Lakewood	02	Climate Zone	8
			03	Occupancy Types Within Project:	All Other OccupanciesOfficeSupport AreasWarehouse

B. PROJECT SCOPE

This table includes electrical systems that are within the scope of the permit application.

01	02	03	04	05	06	07
Electrical Service Designation/ Description	Scope of Work[1]	Rating[2] (kVA)	Utility Provided Metering System Exception to 130.5(a)/ 160.6(a)[3]	System subject to CA Elec Code Article 517 Exception to 130.5(a)and (b)	Demand Response Controls	Provides power to dwelling units/common living areas only in multifamily occupancy
Main	New electrical service equipment and meter	50	☐	☐	Where required, demand response controls must be specified which are capable of receiving and automatically responding to at least one standards based messaging protocol which enables demand response after receiving a demand response signal. Sections 120.2/ 160.3, 130.1/ 160.5, and 130.3/ 160.5, and mechanical, indoor lighting, and sign lighting Certificate of Compliance documents will indicate when demand response controls are required.	☐

[1] FOOTNOTES: Adding only new feeders and branch circuits triggers Voltage Drop 130.5(c)/160.6(c), no other requirements from 130.5/160.6 are required.
[2] If common use areas in a multifamily are submetered, rating is for submeter size serving common use areas.
[3] Applicable if the utility company is providing a metering system that indicates instantaneous kW demand and kWh for a utility-defined period.

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ELC-E
Project Name: Palms Park Community Center	**Report Page:** (Page 2 of 4)
	Date Prepared: 5/23/2024

C. COMPLIANCE RESULTS

Results in this table are automatically calculated from data input and calculations in Tables F through J. Note: If any cell on this table says "COMPLIES with Exceptional Conditions" refer to Table D. Exceptional Conditions for guidance or see applicable Table referenced below.

01		02		03		04	05	06
Service Electrical Metering 130.5(a)/ 160.6(a) (See Table F)	AND	Separation for Monitoring 130.5(b)/ 160.6(b) (See Table G)	AND	Voltage Drop 130.5(c)/ 160.6(c) (See Table H)	AND	Controlled Receptacles 130.5(d)/ 160.6(d) (See Table I)	Electric Ready 160.9 (See Table J)	**Compliance Results**
Yes	AND		AND	Yes	AND			COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. SERVICE ELECTRICAL METERING

This table includes new or replacement electrical service systems OR equipment to demonstrate compliance with 130.5(a) / 160.6(a). For multifamily occupancies, submetered systems that provide power to common use areas must meet the following metering requirements. Submetered systems providing power to dwelling units do not.

01	02	03				04	05	
Electrical Service Designation/ Description	Rating[1] (kVA)	Required Metering Capabilities per Table 130.5-A				Location of Requirements in Construction Documents	Field Inspector	
		Instantaneous Demand (kW)	Historical Peak Demand (kW)	Tracking kWh for user-defined period	kWh per rate period		Pass	Fail
Main	50	☒	☐	☒	☐		☐	☐

[1] FOOTNOTES: If common use areas in a multifamily are submetered, rating is for submeter size serving common use areas.

H. VOLTAGE DROP

This table includes entirely new or complete replacement electrical power distribution systems, or alterations that add, modify or replace both feeders and branch circuits to demonstrate compliance with 130.5(c)/ 160.6(c). For alterations, only the altered circuits must demonstrate compliance per 141.0(b)2Piii/ 180.2(b)4Bviic.

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ELC-E
Project Name: Palms Park Community Center	**Report Page:** (Page 3 of 4)
	Date Prepared: 5/23/2024

H. VOLTAGE DROP

01	02			03	04	05	
Electrical Service Designation/Description	Combined Voltage Drop on Installed Feeder/Branch Circuit Conductors Compliance Method			Location of Voltage Drop Calculations[1]	Sheet Number for Voltage Drop Calculations in Construction Documents	Field Inspector	
						Pass	Fail
Main	☒	Voltage drop less than 5%	☐	Permitted by CA Elec Code (Exception to 130.5(c))*	Attached	E-Sheets	☐	☐

** NOTES: If "Permitted by CA Elec Code *" is selected under Compliance Method above, please indicate where the exception applies in the space provided below.*

[1] FOOTNOTES: Voltage drop calculations may be attached to the permit application outside the construction documents if allowed by the Authority Having Jurisdiction. Select "attached" if applicable. If calculations will be the responsibility of the installing contractor, select "Contractor Responsible".

J. ELECTRIC READY BUILDINGS

This section does not apply to this project.

K. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in this document. If any selection have been changed by permit applicant, an explanation should be included in Table E. Additional Remarks. These documents must be provided to the building inspector during construction and can be found online

Form/Title
NRCI-ELC-E - Must be submitted for all buildings

STATE OF CALIFORNIA
Electrical Power Distribution
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE	NRCC-ELC-E
Project Name: Palms Park Community Center	**Report Page:** (Page 4 of 4)
Project Address: 12305 207th Street	**Date Prepared:** 5/23/2024

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name:	Documentation Author Signature:
Stephen R. Zajicek P.E.	
Company: FBA Engineering	Signature Date: 2024-05-23
Address: 150 Paularino Avenue Suite A120	CEA/ HERS Certification Identification (if applicable): E10372
City/State/Zip: Costa Mesa CA 92626	Phone: 949-852-9995

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name:	Responsible Designer Signature:
Stephen R. Zajicek P.E.	
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PW-23-01

BID SET 06.03.25

⚠1 ELECTRICAL PLAN CHECK RESPONSE

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SEAL / SIGNATURE

JOB NO.	**1533.006**
DRAWN	**Author**
CHECK	**Checker**

TITLE 24 CALCULATIONS

SHEET
E4.3

FBA Engineering / Plot Date: 6/6/2025 10:03 AM / Plotted by: Blake Mesch / Drawing Location: I:\1197003\CLEAN SET\E4.3_TITLE 24 CALCULATIONS_1197.003.dwg
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IRRIGATION NOTES

1. THIS SYSTEM IS DESIGNED TO OPERATE AT A MAXIMUM FLOW OF (23) GPM WITH A MINIMUM (90) STATIC P.S.I. AS INDICATED BY THE RECREATION AND COMMUNITY SERVICES DEPARTMENT. CONTRACTOR SHALL VERIFY PRESSURE PRIOR TO BEGINNING WORK. CONTACT OWNER IMMEDIATELY SHOULD DISCREPANCY ARISE AND RE-DIRECT WORK TO AVOID DELAY.
2. IRRIGATION SYSTEM DESIGN IS DIAGRAMMATIC. WHERE PIPING, VALVES, QUICK COUPLERS, ETC. ARE SHOWN OUTSIDE PLANTING AREAS, OR LIMIT OF WORK, INTENT IS FOR PIPING, VALVES, ETC., TO BE INSTALLED WITHIN PLANTING AREAS OF PROPERTY. INDICATE EXACT LOCATIONS OF IRRIGATION EQUIPMENT ON RECORD DRAWINGS. REFER TO SPECIFICATIONS.
3. CONTRACTOR SHALL PROGRAM CONTROLLER TO ENSURE PROPER IRRIGATION. BASED ON PLANT TYPE, EXPOSURE AND SEASON.
4. CONTRACTOR SHALL USE EXTREME CARE WHERE IT IS NECESSARY TO TRENCH NEAR EXISTING TREES. EXCAVATION IN AREAS EXHIBITING ROOT 3" AND LARGER SHALL BE DONE BY HAND. ROOTS 2" OR LARGER IN DIAMETER DAMAGED IN CONSTRUCTION SHALL BE CLEANLY CUT.
5. CONTRACTOR SHALL MAKE MINOR ADJUSTMENTS TO HEAD LOCATIONS IN FIELD AS NECESSARY.
6. CONTRACTOR SHALL REFER TO DETAILS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
7. DUE TO THE LACK OF COMPLETE IRRIGATION ASBUILTS, ADDITIONAL RENOVATION, REVISION AND RECONSTRUCTION MAY BE REQUIRED TO FACILITATE THE PROPER OPERATION AND COVERAGE OF THE NEW AND EXISTING IRRIGATION SYSTEMS.
8. FULL IRRIGATION RECORD DRAWINGS ARE NOT AVAILABLE FOR THE AREAS WITHIN THE SCOPE OF THIS PROJECT. CONTRACTOR TO PREPARE SHOP DRAWINGS FOR THE REVISED IRRIGATION SYSTEMS AND SUBMIT TO THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. FAILURE TO DO SO WILL RESULT IN CONTRACTOR ASSUMING FULL FINANCIAL RESPONSIBILITY FOR THE COST OF RE-DESIGN AND INSTALLATION OF AN APPROVED IRRIGATION SYSTEM.

IRRIGATION LEGEND

SYM.	MANUFAC.	MODEL NO./ DESCRIPTION	RAD.	GPM	PSI	DTL REF
•	HUNTER	PCB-50-R BUBBLER ON RISER. 2 PER TREE.	5	.50	30	L/C D1/D2
○	HUNTER	PCB-50-R BUBBLER ON RISER IN POT.	5	.50	30	D D1
◉	HUNTER	PCN-25-R BUBBLER HEAD WITH HC-50F-50M-CV ON FLEXIBLE PIPE. ONE PER SHRUB	-	.25	30	J D1
	SUPERIOR	950PRS SERIES BRASS REMOTE CONTROL VALVE - SIZE AS NOTED. INSTALL IN PURPLE LOCKING VALVE BOX.				C D1
	NIBCO	GATE VALVES 2" AND SMALLER SHALL BE NIBCO T-113. INSTALL ONE DURA COUPLING MANIFOLD SYSTEM (O-RING MIPT X SWIVEL) AND A SCH 80 MALE ADAPTER				F,G D1
♦	RAINBIRD	44-NP 1" QUICK COUPLER WITH PURPLE LOCKING RUBBER CAP				D D1
		1" SCHEDULE 40 PVC (PURPLE) WITH SOLVENT-WELD FITTINGS, WITH 18" COVER.				A D1
		1.25" SCHEDULE 40 PVC (PURPLE) WITH SOLVENT-WELD FITTINGS, WITH 18" COVER.				A D1
		MAINLINE - 2" AND SMALLER: PURPLE SCHEDULE 40 PVC WITH SOLVENT-WELD FITTINGS. LINE SHALL HAVE 24" COVER, 30" COVER UNDER PAVEMENT. INSTALL WITH TRACER WIRE.				A D1
		IRRIGATION SLEEVE - PURPLE CLASS 200 PVC, WITH 30" COVER. SIZE TO BE TWICE THE DIAMETER OF PIPES WITHIN THE SLEEVES.				A D1
		EXISTING MAINLINE. CONTRACTOR TO VERIFY EXACT LOCATION IN THE FIELD.				
P.O.C.		POINT OF CONNECTION - EXISTING WATER METER AND BACKFLOW DEVICE. STATIC PRESSURE IS REPORTED TO BE 90 PSI AT POINT OF CONNECTION. CONTRACTOR SHALL VERIFY LOCATION OF EXISTING SUPPLY LINE AND WATER PRESSURE.				
NOT SHOWN		EXISTING CONTROLLER IS EXPECTED TO BE AT BASKETBALL COURT AND IS BELIEVED TO HAVE 6 SPARE STATIONS. CONTRACTOR TO CONFIRM LOCATION, FUNCTIONALITY, CONNECTIVITY AND CAPACITY TO ACCOMMODATE NEW IRRIGATION VALVES. NOTIFY OWNERS REP IMMEDIATELY IF THIS IS NOT FEASIBLE.				

1 = CONTROLLER STATION NUMBER
1.5" = CONTROL VALVE SIZE
23 = APPROX. GPM FLOW THROUGH VALVE

CONTRACTOR TO PULL NEW CONTROL WIRES FROM EXISTING CONTROLLER TO NEW CONTROL VALVES. RENUMBER NEW CONTROL VALVES ACCORDINGLY.

CONNECT NEW MAINLINE TO EXISTING MAINLINE. CONTRACTOR TO LOCATE EXISTING MAINLINE IN THE FIELD.

x1 1.5" 23

x2 1" 5

1 1/2"

EXISTING IRRIGATION HEADS AND LATERALS TO BE REMOVED IN THIS PLANTER. PRIOR TO CAPPING AND REMOVAL OF EXISTING IRRIGATION, CONTRACTOR TO CONFIRM REMOVAL OF IRRIGATION IN THIS AREA WILL NOT AFFECT LANDSCAPE AREAS THAT ARE TO REMAIN.

ADJUST EXISTING GRASS IRRIGATION AS NECESSARY TO MAINTAIN HEAD TO HEAD COVERAGE, MINIMIZE OVERSPRAY ONTO HARDSCAPE AND BUILDING

EXISTING CONTROLLER AT BASKETBALL COURT IS BELIEVED TO HAVE 6 SPARE STATIONS. CONTRACTOR TO CONFIRM FUNCTIONALITY, CONNECTIVITY AND CAPACITY TO ACCOMMODATE NEW IRRIGATION SYSTEM.

CONNECT NEW MAINLINE TO EXISTING MAINLINE. CONTRACTOR TO LOCATE EXISTING MAINLINE IN THE FIELD.

1 1/2"

x3 1" 6

x4 1" 1

x5 1" 1

CONTRACTOR TO PULL NEW CONTROL WIRES FROM EXISTING CONTROLLER TO NEW CONTROL VALVES. RENUMBER NEW CONTROL VALVES ACCORDINGLY.

ADJUST EXISTING GRASS IRRIGATION AS NECESSARY TO MAINTAIN HEAD TO HEAD COVERAGE, MINIMIZE OVERSPRAY ONTO HARDSCAPE AND BUILDING

EXISTING IRRIGATION HEADS AND LATERALS TO BE REMOVED IN THIS AREA. PRIOR TO CAPPING AND REMOVAL OF EXISTING IRRIGATION, CONTRACTOR TO CONFIRM REMOVAL OF IRRIGATION IN THIS AREA WILL NOT AFFECT LANDSCAPE AREAS THAT ARE TO REMAIN.

ADJUST EXISTING GRASS IRRIGATION AS NECESSARY TO MAINTAIN HEAD TO HEAD COVERAGE, MINIMIZE OVERSPRAY ONTO HARDSCAPE AND BUILDING

0' 5' 10' 20' 30'

PROJECT NORTH

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CITY OF LAKEWOOD CALIFORNIA
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VERDE DESIGN
LANDSCAPE ARCHITECTURE
CIVIL ENGINEERING
SPORT PLANNING & DESIGN
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PW-23-01

BID SET 06.03.25

REGISTERED LANDSCAPE ARCHITECT
MARK S. BAGINSKI
No. 4089
Signature
EXPIRATION DATE: JULY, 2027
STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	MS
CHECK	CG

SHEET NAME
IRRIGATION PLAN

SHEET
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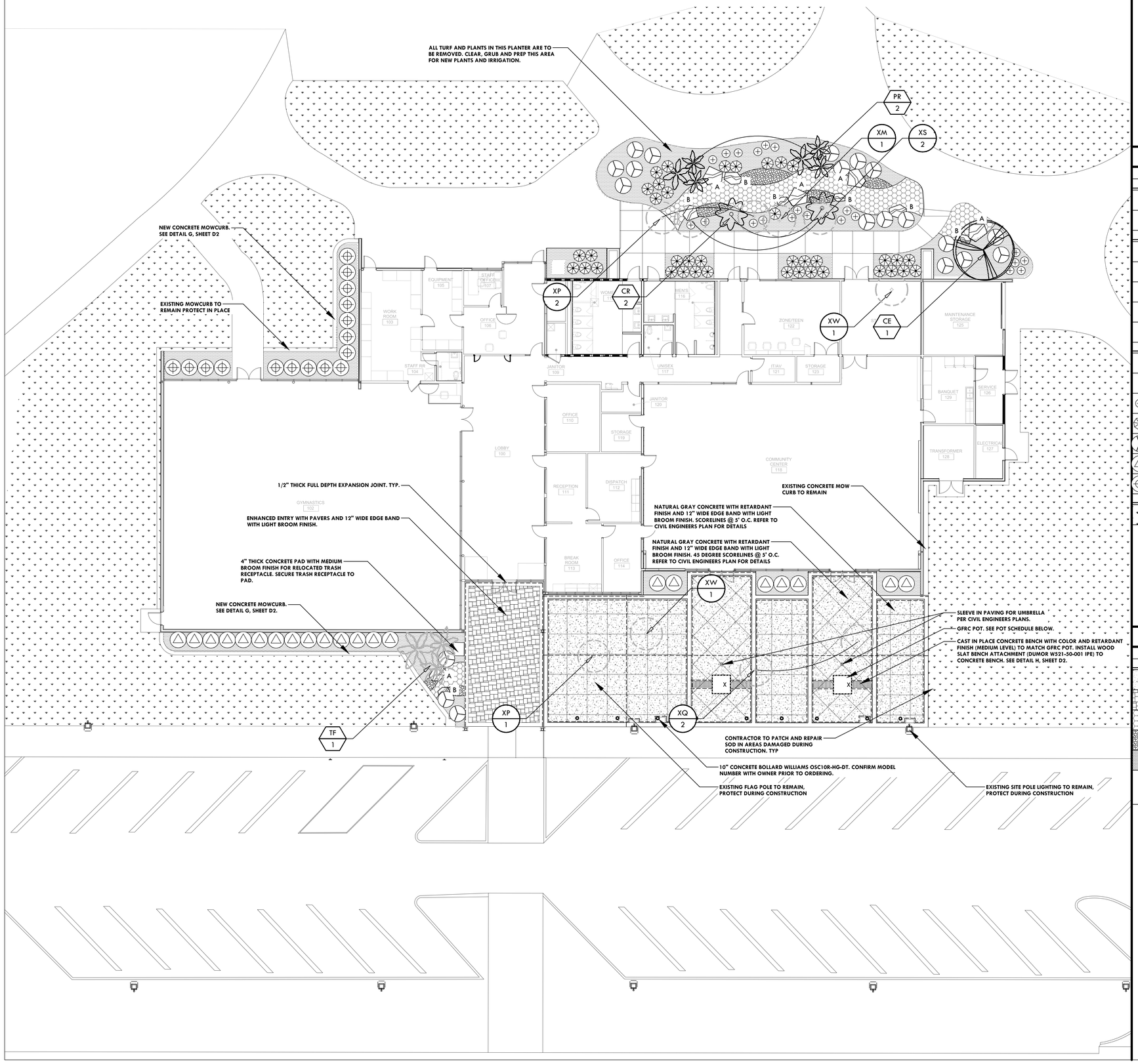

PLANTING NOTES

1. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL PLANT MATERIAL FROM TIME OF DELIVERY TO TIME OF FINAL ACCEPTANCE. OWNER SHALL NOT BE RESPONSIBLE FOR LOSSES DUE TO VANDALISM, THEFT OR SEVERE WEATHER.
2. CONTRACTOR SHALL PLACE PLANT MATERIALS SO THEY DO NOT INTERFERE WITH IRRIGATION SYSTEM OR INHIBIT REQUIRED COVERAGE. PLANT LOCATIONS MAY BE ADJUSTED AS LONG AS DESIGN INTENT IS NOT COMPROMISED. CONTRACTOR SHALL SET OUT PLANT MATERIAL AS PER PLAN AND RECEIVE ACCEPTANCE FROM OWNER'S REPRESENTATIVE WITH RESPECT TO PLANT HEALTH AND LOCATION PRIOR TO INSTALLATION. CONTRACTOR SHALL GIVE MINIMUM 2 WORKING DAYS NOTICE FOR OBSERVATION AND SHALL HAVE ALL PLANT MATERIAL IN SPECIFIED LOCATIONS FOR REVIEW AT ONE TIME. CONTRACTOR SHALL REPLACE ANY MATERIAL AS REQUESTED BY OWNER'S REPRESENTATIVE.
3. WHEN WORK HAS TO OCCUR UNDER THE DRIPLINE OF EXISTING TREES NOT SCHEDULED FOR REMOVAL, THE CONTRACTOR SHALL USE ALL POSSIBLE CARE TO AVOID INJURY TO THE TREES AND TREE ROOTS. GRADE IN LINES RADIAL TO THE EXISTING TREES RATHER THAN TANGENTIAL. ALL PARTIAL CUTS OR TEARS THROUGH ROOTS TWO INCHES IN DIAMETER AND LARGER SHALL BE CUT CLEAN. TRENCHES ADJACENT TO TREES SHALL BE FILLED WITHIN 24 HOURS AFTER EXCAVATION, BUT WHERE THIS IS NOT POSSIBLE, THE SIDE OF THE TRENCH ADJACENT TO THE TREE, AND ANY EXPOSED ROOTS SHALL BE KEPT SHADED AND MOIST WITH DAMPENED BURLAP OR CANVAS.
4. ALL PLANTERS TO RECEIVE SOIL AMENDMENTS AND SOIL PREPARATION PER SPECIFICATIONS UNLESS OTHERWISE NOTED.
5. ANY PLANT MATERIAL, INCLUDING TREES, SHRUBS, AND GROUNDCOVER SHALL REMAIN 12" MIN. CLEAR OF ROOF DRAINS. PROVIDE PRECAST CONCRETE SPLASH BLOCK WITH GRAVEL WHERE ROOF DRAINS OUTLET INTO THE PLANTER AREA (EXCEPT AT GRASS). LOCATE ROOF DRAINS IN FIELD PRIOR TO INSTALLING PLANT MATERIAL.
6. ANY PLANT MATERIAL, INCLUDING TREES, SHRUBS, AND GROUNDCOVER SHALL REMAIN 6"-12" MIN. CLEAR OF EDGEBANDS, CURBS, AND HARDSCAPE AREAS.
7. KEEP TREES, SHRUBS, AND GROUNDCOVER 2' MINIMUM CLEAR OF ELECTRICAL, DATA, TELEPHONE, PLUMING, STORM DRAIN, WATER, HYDRONIC, OR OTHER UTILITY BOXES, VALVE BOXES, AND VAULTS. ALLOW PATH OF TRAVEL FOR MAINTENANCE STAFF TO ACCESS UTILITIES FOR MAINTENANCE.

PLANTING LEGEND

SYM	QTY	SIZE	BOTANICAL/COMMON NAME	SPACING/ COMMENTS	DTL REF
EXISTING TREES TO REMAIN, PROTECT IN PLACE					
CE	1	-	EXISTING CERCIDIUM x 'DESERT MUSEUM' / DESERT MUSEUM PALO VERDE TO REMAIN, PROTECT IN PLACE		
TF	1	-	EXISTING TRACHYCARPUS FORTUNEI / WINDMILL PALM TO REMAIN, PROTECT IN PLACE		
EXISTING TREES TO BE REMOVED					
XW	2	-	EXISTING WINDMILL PALM TO BE REMOVED		
XP	3	-	EXISTING PYGMY DATE PALM TO BE REMOVED		
XQ	2	-	EXISTING QUEEN PALM TO BE REMOVED		
XS	2	-	EXISTING SAGO PALM TO BE REMOVED		
XM	1	-	EXISTING MALLET FLOWER TO BE REMOVED		
PROPOSED PLANTING					
PR	2	15 GAL	PHOENIX ROEBELENII PYGMY DATE PALM (MULTI-TRUNK)	AS SHOWN	C D2
CR	2	15 GAL	CYCAS REVOLUTA SAGO PALM	AS SHOWN	C D2
AB	21	1 GAL	ALOE 'BLUE ELF' BLUE ELF ALOE	AS SHOWN	B D2
DT	38	5 GAL	DIANELLA T. 'VARIEGATA' VARIEGATED FLAX LILY	AS SHOWN	A,B D2
LN	20	1 GAL	LANTANA 'NEW GOLD' YELLOW LANTANA	AS SHOWN	B D2
LT	21	15 GAL	LEUCOPHYLLUM 'THUNDER CLOUD' TEXAS RANGER	AS SHOWN	B D2
MC	16	5 GAL	MYRTUS COMMUNIS COMMON MYRTLE	AS SHOWN	B D2
EXISTING					
			EXISTING GRASS TO REMAIN, PROTECT IN PLACE. WHERE GRASS IS DAMAGED DURING CONSTRUTION OPERATIONS, CONTRACTOR PATCH AND REPAIR WITH SOD TO MATCH EXISTING TYPE OF GRASS		

POT SCHEDULE

POTS ARE TO BE WILSHIRE COLLECTION, AVAILABLE FROM TOURNESOL SITEWORKS (800-542-2282). COLOR TO BE SHADOW WITH ACID ETCH FINISH. PROVIDE HOLES FOR DRAIN AND IRRIGATION. WATERPROOF AND SEAL IRRIGATION CONNECTION AFTER INSTALLATION. CONFIRM COLOR SELECTION WITH OWNER PRIOR TO ORDERING. ALLOW 8-12 WEEKS LEAD TIME. INSTALL OVER DRAIN PER DETAIL N, SHEET D1.

SYM	QTY	MODEL	DESCRIPTION	PLANT WITH	COMMENTS
X	2	WCR-6000F	60"x60"x42" GFRC POT	(1) 5/G Dianella t. 'Variegata' (8) 1/G Ajuga reptans (5) 1/G Festuca 'Elijah Blue'	Place in center of pot Symmetrically spaced Randomly spaced

HARDSCAPE LEGEND

SYM	DESCRIPTION	DTL REF
	NATURAL GRAY CONCRETE WITH RETARDANT FINISH. TOP CAST SURFACE RETARDER, GRADE 25, ETCH DEPTH SHALL BE 1/8" TO 1/4". REFER TO CIVIL ENGINEERS PLANS FOR CONCRETE DETAILS	
	PAVERS TO BE ORCO ICON EXPRESS SET, 60MM, MICRO CHAMFER; COLOR: BORREGO. FINISH: SHOT BLAST (SB), IN HERRINGBONE PATTERN. INSTALL ON CONCRETE BASE, PER MANUFACTURERS RECOMMENDATIONS.	O D1
	4"-8" DIA. ROCK RUBBLE, PER SPECIFICATIONS	I D2
	3/4" DIA. CRUSHED ROCK PER SPECIFICATIONS	F D2
	2" THICK LAYER OF DECOMPOSED GRANITE PAVING. SOUTHWEST BOULDER (714-882-1010) CALIFORNIA GOLD, OR APPROVED EQUAL. CONFIRM SELECTION WITH OWNER PRIOR TO ORDERING.	F D2
	LANDSCAPE BOULDER TO MATCH EXISTING BOULDERS ON SITE. PROVIDE SAMPLE TO OWNER FOR APPROVAL PRIOR TO ORDERING. MAXIMUM HEIGHT OF BOULDERS FROM GRADE NOT TO EXCEED 18". APPROXIMATE SIZES: A - 48" x 36" B - 24" x 36"	E D2

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PALMS PARK COMMUNITY CENTER
12305 207TH ST, LAKEWOOD, CA 90715
PW-23-01

BID SET 06.03.25

REGISTERED LANDSCAPE ARCHITECT
MARK S. BADINSKY
No. 4089
Signature
EXPIRATION DATE: JULY, 2027
STATE OF CALIFORNIA
SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	MS
CHECK	CG

SHEET NAME
PLANTING PLAN

SHEET
L3.1

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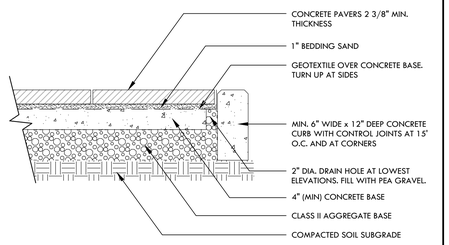
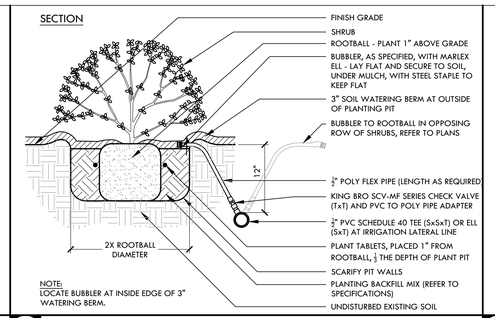


SECTION

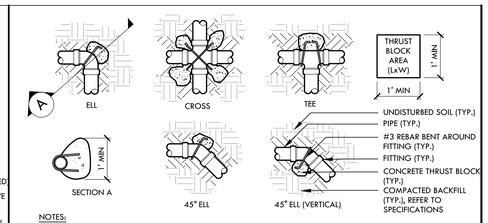
U

O INTERLOCKING PAVERS NTS



NOTE:
LOCATE BUBBLER AT INSIDE EDGE OF 3" WATERING BERM.

J SHRUB PLANTING WITH BUBBLER NTS



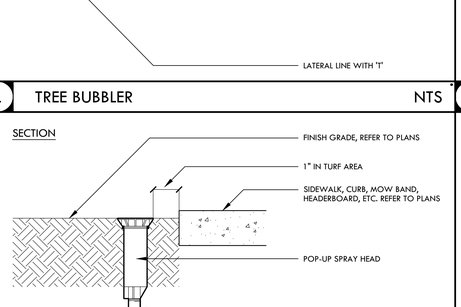
NOTES:
1. SUPPLY LINES 3" DIA. AND LARGER OR GATE VALVES 2½" OR LARGER SHALL RECEIVE CONCRETE THRUST BLOCKS.
2. MIN. THRUST BLOCK AREAS ARE BASE ON A SOIL BEARING CAPACITY OF 3,000 LBS/SF.
3. THRUST BLOCK SHALL EXTEND INTO UNDISTURBED SOIL.
4. CONCRETE SHALL NOT COVER FITTING JOINTS.
5. MAIN LINE PIPING 4" AND LARGER SHALL HAVE DUCTILE IRON FITTINGS WITH JOINT RESTRAINTS INSTALLED AT ALL FLOW DIRECTION CHANGES (CONCRETE THRUST BLOCK NOT REQUIRED).

MINIMUM THRUST BLOCK AREA (LxW)		
PIPE SIZE	IRRIGATION PIPE	
	TEE, DEAD END, 90° BEND	45°,22.5°
2"	1 SF	.5 SF
3"	2 SF	1 SF

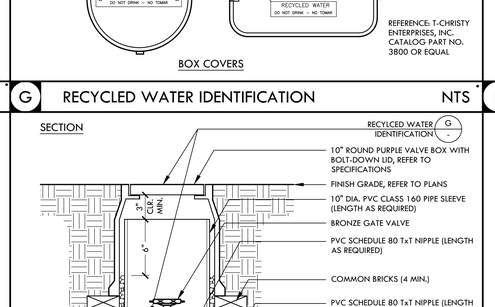
E THRUST BLOCK NTS

T

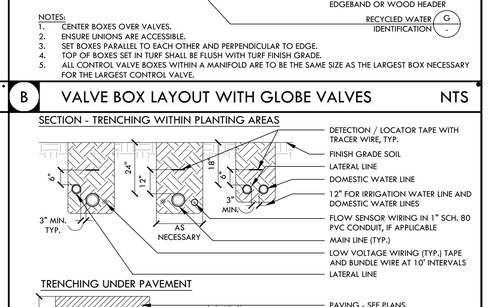
N POT WITH DRAIN NTS



I SPLICE BOX NTS



D QUICK COUPLER VALVE NTS

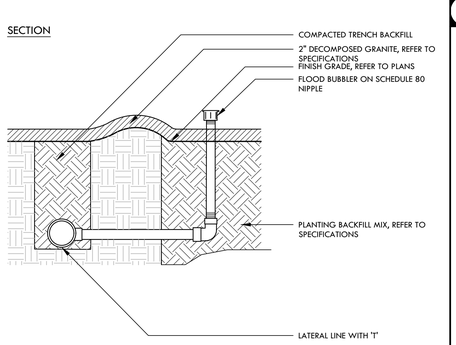


NOTE:
VALVE TO HAVE 2" MIN. CLEARANCE FROM LID BOTTOM TO TOP OF VALVE CAP.

S

R

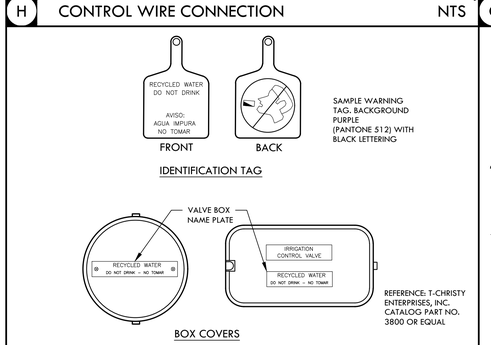
L TREE BUBBLER NTS



TRUNK TO BUBBLER SPACING	
SIZE	SPACING
15 GALLON TREE	15"
24" BOX TREE	20"
36" BOX TREE	25"

NOTE:
1. BUBBLERS ARE REQUIRED FOR TREES IN LAWN AND SHRUB AREA. TWO BUBBLERS PER TREE ARE TO BE PLACED ON OPPOSITE SIDES OF ROOTBALL. ORIENT BUBBLERS 180° FROM EACH OTHER.

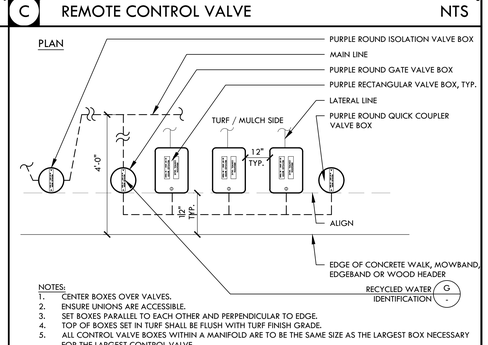
G RECYCLED WATER IDENTIFICATION NTS



NOTE:
MAXIMUM WIRE SIZES PER CONNECTOR ARE (3) - #14'S OR (2) - #12'S.

H CONTROL WIRE CONNECTION NTS

C REMOTE CONTROL VALVE NTS



NOTES:
1. CENTER BOXES OVER VALVES.
2. ENSURE UNIONS ARE ACCESSIBLE.
3. SET BOXES PARALLEL TO EACH OTHER AND PERPENDICULAR TO EDGE.
4. TOP OF BOXES SET IN TURF SHALL BE FLUSH WITH TURF FINISH GRADE.
5. ALL CONTROL VALVE BOXES WITHIN A MANIFOLD ARE TO BE THE SAME SIZE AS THE LARGEST BOX NECESSARY FOR THE LARGEST CONTROL VALVE.

B VALVE BOX LAYOUT WITH GLOBE VALVES NTS

P

K POP UP AND SWING JOINT NTS

F GATE VALVE - 2" AND SMALLER IN SIZE NTS

NOTE:
VALVE TO HAVE 3" MIN. CLEARANCE FROM LID BOTTOM TO TOP OF 10" SLEEVE

A IRRIGATION PIPE TRENCHING NTS

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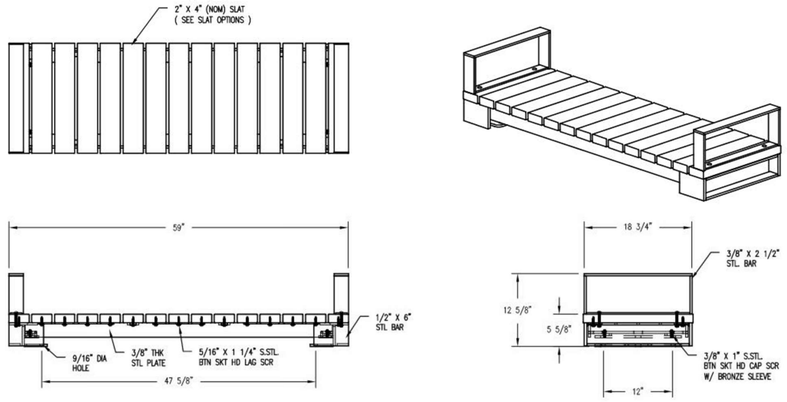
REGISTERED LANDSCAPE ARCHITECT MARK S. BAGWELL No. 4089 Signature EXPIRATION DATE: JULY 2027 STATE OF CALIFORNIA

SEAL / SIGNATURE

JOB NO.	1533.006
DRAWN	MS
CHECK	CG

SHEET NAME
IRRIGATION DETAILS

SHEET
D1



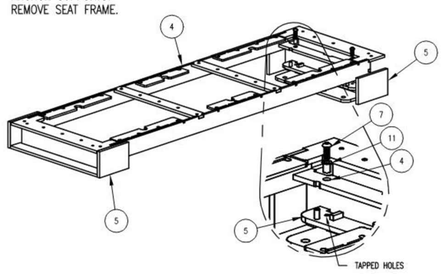
NOTES:
1.) ALL STL. MEMBERS COATED W/ ZINC RICH EPOXY THEN FINISHED W/ POLYESTER POWDER COATING.
2.) 1/2" X 3 3/4" EXPANSION ANCHOR BOLTS PROVIDED.

SLAT OPTIONS
WOOD
RECYCLED PLASTIC
WOOD GRAIN RECYCLED PLASTIC

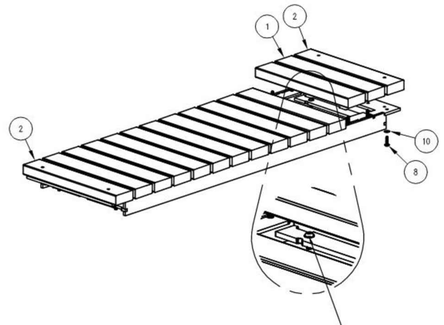
NOTES:
1.) DURING ASSEMBLY PROCEDURE; DO NOT COMPLETELY TIGHTEN HARDWARE.
2.) THE ACTUAL PARTS WILL NOT BE NUMBERED. NUMBERS ONLY APPLY TO DRAWING.
3.) UPON COMPLETION OF ASSEMBLY SQUARE ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.
4.) MOUNT AND ANCHOR AS SPECIFIED.

TOOLS REQ'D
3/4" WRENCH
1/2" WRENCH
1/4" ALLEN WRENCH
1/2" MASONRY DRILL BIT
DRILL

(1) ATTACH SEAT FRAME TO SUPPORTS. ANCHOR SUPPORTS. REMOVE SEAT FRAME.



(2) WITH 3/8" BUTTON HEADS IN PLACE, ATTACH SEAT SLATS.



PARTS LIST

ITEM	QTY	PART NO	DESCRIPTION
1	13	0-521-00-03	19" SEAT SLAT
2	2	0-521-00-04	19" SEAT SLAT, END ARMREST, TX
3	2	0-521-00-09	STL ARMREST
4	1	0-521-50-02	5' STL BKLS SEAT FRAME
5	2	0-W521-00-01	STL WALL MT SUPPORT
6	4	1-11-035	5/16" X 2 1/2" SS CGE BOLT
7	4	1-12-097	3/8" X 1" SS BTN SKT HD CAP SCR
8	30	1-13-023	5/16" X 1 1/4" SS BTN SKT HD LAG
9	4	1-20-020	5/16" SS THIN NYLON LOCKNUT
10	34	1-22-017	5/16" SS FLAT WASHER
11	4	5-48-510	1/2"ODX3/8" ID BRONZE SLEEVE BEARING 3/4"LONG

KITS PROVIDED

ITEM	QTY	PART NO	DESCRIPTION
12	1	K-ANC0860-4	1/2" X 3 3/4" SS ANCHOR KIT (4PC)
13	1	K-BL0524-30	5/16" LAG HARDWARE KIT (30PC)
14	1	K-CC0540-2TL	5/16" CGE BOLT HARDWARE KIT (2PC)
15	1	K-W520	520 WALL MT SUPPORT HARDWARE KIT

NOTES:
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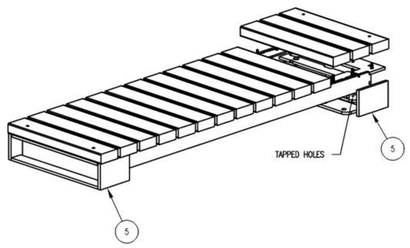
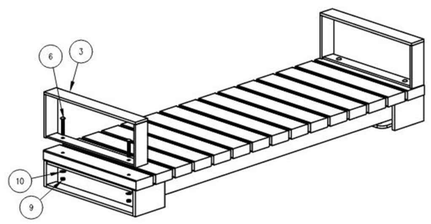
2.) THE ACTUAL PARTS WILL NOT BE NUMBERED. NUMBERS ONLY APPLY TO DRAWING.
3.) UPON COMPLETION OF ASSEMBLY SQUARE ALL COMPONENTS THEN TIGHTEN ALL HARDWARE.
4.) MOUNT AND ANCHOR AS SPECIFIED.

TOOLS REQ'D
3/4" WRENCH
1/2" WRENCH
1/4" ALLEN WRENCH
1/2" MASONRY DRILL BIT
DRILL

(3) ATTACH STEP 2 TO SUPPORTS WITH 3/8" BUTTON HEADS IN STEP 2.



(4) ATTACH ARMRESTS.



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15	1	K-W520	520 WALL MT SUPPORT HARDWARE KIT

DuMor, inc.

ASSEMBLY INSTRUCTIONS

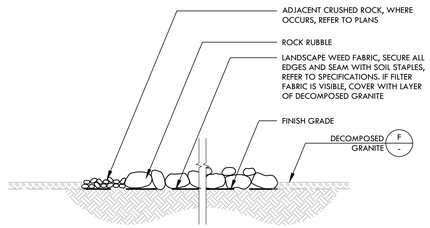
DATE DRAWN :	02/08/23
DRAWN BY :	ESS
DATE REV. :	
REV. BY :	

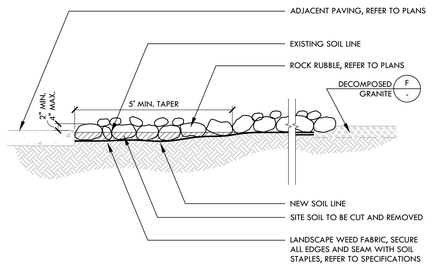
REV. A

DRAWING NUMBER W521-50-001

SHEET 3 OF 3

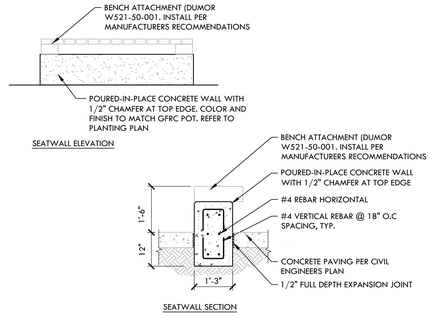
J BENCH ATTACHMENT INSTRUCTIONS



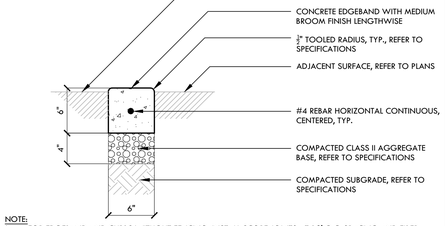


ROCK RUBBLE ADJACENT TO PAVING

I ROCK RUBBLE NTS



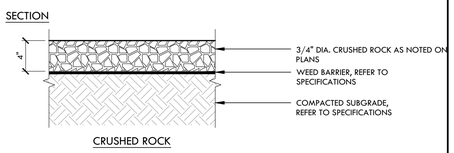
H SEAT WALL NTS



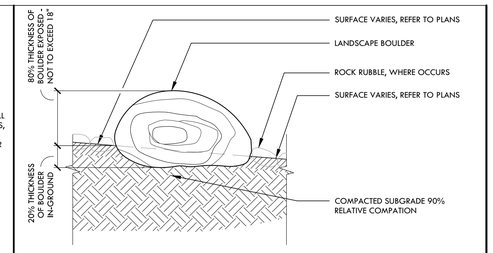
NOTE:
1. FOR EDGEBAND AND CURBS WITHOUT FENCING, INSTALL SCORE JOINTS AT 10' O.C. SPACING AND FIBER EXPANSION JOINTS EVERY 20' ON STRAIGHT RUNS. ON CURVED RUNS, FIBER EXPANSION JOINTS SHALL BE SPACED 10' O.C., WITH ALTERNATING SCORE JOINTS AT 5' O.C. SPACING.
2. ALL EXPANSION JOINTS SHALL BE SEALED, PER SPECIFICATIONS.

FINISHES:
EDGEBANDS: MEDIUM BROOM

G 6" WIDE EDGEBAND NTS

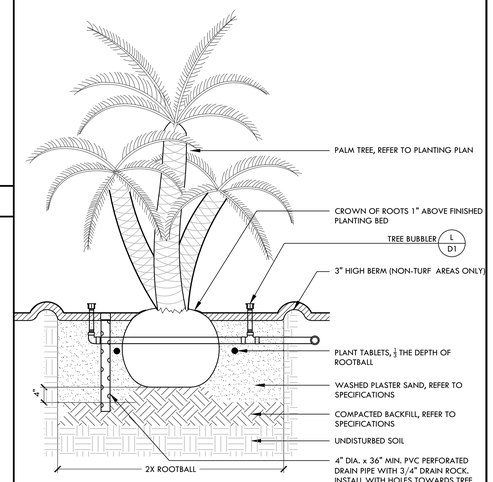


F DECOMPOSED GRANITE / CRUSHED ROCK NTS

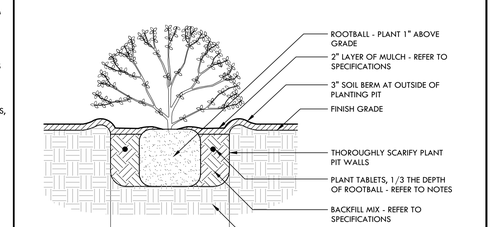


E BOULDER INSTALLATION NTS

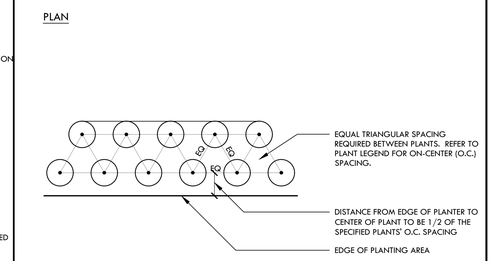
SECTION



C PALM TREE PLANTING NTS



B SHRUB PLANTING NTS



A TRIANGULAR SPACING DIAGRAM NTS

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949-250-4680

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12305 207TH ST, LAKEWOOD, CA 90715
PW-23-01

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REGISTERED LANDSCAPE ARCHITECT
MARK S. BACHMAN
No. 4089
Signature
EXPIRATION DATE: JULY 2027
STATE OF CALIFORNIA
SEAL / SIGNATURE

JOB NO. 1533.006
DRAWN MS
CHECK CG

SHEET NAME
IRRIGATION AND PLANTING DETAILS

SHEET
D2

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DRAFT - PROJECT SPECIFICATIONS

D-R-A-F-T

CITY OF LAKEWOOD
CALIFORNIA

PUBLIC WORKS PLANS
AND SPECIFICATIONS FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS

PROJECT NO. PW23-01

PREPARED FOR

CITY OF LAKEWOOD
5050 CLARK AVENUE
LAKEWOOD, CA 90712

ARCHITECT OF RECORD:

DAHLIN ARCHITECTURE | PLANNING | INTERIORS
18818 TELLER AVENUE
IRVINE, CA 92612

DRAFT

CITY OF LAKEWOOD

SPECIFICATIONS FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

Approved By:

_____ _____

Kelli A. Pickler, P.E. Date
Director of Public Works/City Engineer
License No. 58367
Expiration Date _____

CITY OF LAKEWOOD

TABLE OF CONTENTS
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

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CITY OF LAKEWOOD

NOTICE INVITING BIDS

PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

NOTICE IS HEREBY GIVEN that sealed bids for the **Palms Park Community Center Improvements** ("Project"), Project No. PW23-01, in the City of LAKEWOOD will be received at the Office of the City Engineer at 5050 Clark Avenue, Lakewood, CA, 90712, until **XX:XX p.m. on Day, Date**, at which time they will be publicly opened and read aloud.

PRE-BID MEETING: A **mandatory** pre-bid meeting will be held at [xxxxxx] on [date/time]. This is a HUD Section 3 construction contract. The Bidder/Proposer must declare an intent to comply with Section 3 requirements, including benchmarks, in order to be a responsive bidder/proposer eligible for contract award. The mandatory pre-bid meeting will be held to discuss the Section 3 bid preference and requirements. Prospective bidders/proposers should carefully read the information. Proposals that fail to comply with the requirements of Section 3 will be considered non-responsive and excluded from further consideration.

The Bidder/Proposer is required to complete and submit the Declaration of Intent to comply with Section 3 Requirements - Required Contract Forms and Certifications, certifying that they intend to comply with the Section 3 provisions as defined in Section 3 of the Housing and Urban Development Act of 1968, As Amended

DESCRIPTION OF THE WORK: In general, the work is comprised of renovation of an existing public building and parking lot. The Palms Park Community Center is located in east Lakewood at 12305 207th St, Lakewood, CA 90715. The purpose of the Palms Park Community Center Improvements project is to provide infrastructure reinvestment and renewal due to the age and the condition of the facility. The project scope includes the addition of a new ADA Compatible restroom, removal of existing outdoor patio area and replacement with additional indoor space, path of travel improvements, storefront and other exterior siding improvements, flooring and ceiling renovation, asbestos abatement, roof replacement, HVAC system replacement, new fire sprinkler system, electrical improvements, lighting upgrades, renovation of office, storage and assembly room spaces, park hardscape and parking lot improvements and interior/exterior signage upgrades.

OBTAINING OR INSPECTING CONTRACT DOCUMENTS: Plans, Specifications, and Contract Documents may be obtained for a non-refundable fee of $____, at the office of the City Clerk, Lakewood City Hall, 5050 Clark Avenue, Lakewood, California, or may be mailed upon written request accompanied by advanced payment of $_____. It is the contractor's responsibility to ensure they are on the City's Plan Holder's List and they obtain any addenda or clarifications that are issued by the City on the City's website prior to submitting a bid. For any questions regarding acquisition of Contract Documents, contact the City Clerk at cityclerk@lakewoodca.gov or by phone at 562-866-9771, ext. 2200.

BID PROPOSAL AND BOND: No bid will be considered unless it is made on a Proposal form furnished by the City. No Bidder may withdraw its Proposal for a period of ninety (90) days after the time set for opening thereof. Each bid must be accompanied by cash, a certified cashier's check, or a bidder's bond made payable to the City of Lakewood for an amount equal to at least ten percent (10%) of the amount bid, such guarantee to be forfeited should the bidder to whom the contract is awarded fail to furnish the required bonds and insurance and enter into a contract with the City within the period of time provided by the proposal requirements. In the event that a surety bond is submitted in lieu of the foregoing, it shall be subject to the condition that the surety thereon and the form of the bond be approved by the City Attorney.

AWARD OF CONTRACT: The City reserves the right after opening bids to reject any or all bids, to waive any informality in a bid, or to make award to the lowest responsive, responsible Bidder as determined by the Proposal, and reject all other bids, as it may best serve the interest of the City. Within three (3) days of bid opening, the

apparent low Bidder must submit a revised bid bond with numerical dollar values, both in words and with digits of the Bid Bond amount. Within ten (10) working days after the date of the formal Notice of Apparent Low Bidder, the successful Bidder will be required to submit the fully executed Contract Agreement, Bonds (Faithful Performance and Payment (Material and Labor)) and Insurance, all meeting the standards of the City.

CONTRACTOR'S LICENSE CLASSIFICATION: The Contractor shall possess a valid **Class B Contractor's License**, as necessary to perform the work, at the time of contract award, in accordance with provisions of Chapter 9, Division III of the California Business and Professions Code. The Contractor must be properly licensed as a contractor from contract award through Contract acceptance (23CFR 635.110).

WAGE RATE REQUIREMENTS: The wage rates applicable to this Project are the State of California Department of Industrial Relations prevailing rates of per diem wages and Davis-Bacon Federal Wage Rates, whichever are higher. In accordance with the provisions of Sections 1773.2 of the California Labor Code, copies of the general prevailing rate of per diem wages as determined by the State Director of Industrial Relations are available on the Internet at the State Department of Industrial Relations website https://www.dir.ca.gov/Public-Works/Prevailing-Wage.html. The Davis-Bacon Federal Wage Rates are available here: https://sam.gov/content/wage-determinations. It shall be mandatory upon the Contractor to whom the contract is awarded and upon any subcontractor to pay not less than said specified rates to all workers employed by them in the execution of the contract. A copy of said rates shall be posted at each job site during the course of construction. The Contractor and all subcontractors shall comply with all provisions of the California Labor Code relating to prevailing wage rates, including Sections 1770–1781.

This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. The Department of Industrial Relations shall monitor and enforce compliance with applicable prevailing wage requirements for the contract. The reporting requirements may be found at https://www.dir.ca.gov/Public-Works/Contractors.html. The Contractor is responsible for complying with all requirements of the Department of Industrial Relations, including filing electronic payroll reports. A contractor or subcontractor will not be qualified to bid on, be listed in a bid Proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5. It is not a violation of Labor Code Section 1771.1 for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded.

Additionally, the Contractor is required to comply with the provisions outlined in Form HUD-4010 (Federal Labor Standards Provisions), which are incorporated by reference into this contract. The form specifies the Davis-Bacon Act requirements, Equal Employment Opportunity (EEO) obligations, and other relevant federal labor standards that apply to this HUD-funded project. HUD Form 4010 may be found at https://www.hud.gov/sites/dfiles/OCHCO/documents/4010.pdf.

EQUAL EMPLOYMENT AND CONTRACTING OPPORTUNITY- MINORITY BUSINESS ENTERPRISES (MBEs): The City of Lakewood hereby notifies all bidders that it is committed to ensuring equal opportunity in its contracting process. All qualified businesses, including small, minority-owned, women-owned, and disadvantaged business enterprises, are encouraged to participate. No contractor or subcontractor will be discriminated against based on race, color, national origin, sex, disability, or any other protected characteristic. Contractors must make good faith efforts to engage diverse businesses and comply with all applicable federal, state, and local equal opportunity requirements."

DEBARRED, SUSPENDED OR INELIGIBLE CONTRACTORS OR SUBCONTRACTORS: Per 24 CFR Part 5 and Executive Orders 12549 and 12689, debarred, suspended, or ineligible contractors/subcontractors are prohibited. All bidders must be registered in SAM.gov, provide a valid UEI number, and certify their eligibility. Verification will be conducted before contract award. Failure to comply may result in bid rejection or contract termination.

RETENTION FROM PAYMENTS: The Contractor may elect to receive 100 percent of payments due under the Contract Documents from time to time, without retention of any portion of the payments by the City, by depositing securities of equivalent value with the City in accordance with the provisions of Section 22300 of the Public Contract Code. If the Contractor chooses not to exercise its rights under Public Contract Code Section 22300, the full five percent (5%) retention will be deducted from all payments. The final retention will be authorized for payment thirty-five (35) days after the date of recordation of the Notice of Completion, if no Stop Notices or liens have been filed. The City may withhold from release of the final retention amounts authorized under Public Contracts Code Section 7107 and/or 125% of amounts identified in accordance with any received Stop Notices.

BUY AMERICA: All contractors and subcontractors must comply with the Build America, Buy America Act (BABA) requirements as outlined in 24 CFR Part 75 and HUD's implementation guidance. All iron, steel, manufactured products, and construction materials used in this project must be produced in the United States, in accordance with BABA requirements. Contractors must document and certify compliance, including providing material origin documentation. Waivers may apply under specific circumstances as determined by HUD. Failure to comply may result in contract termination or other penalties.

Dated this XX day of {Month, Year].

City of LAKEWOOD, California

BY _____
Jo Mayberry, CMC
CITY CLERK
5055 Clark Avenue
Lakewood, CA 90712

Published: [publication name]
[Dates]

[Publish for a minimum of 21 Calendar days]

CITY OF LAKEWOOD

INSTRUCTIONS TO BIDDERS
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

1. PROPOSAL FORMS

Bids shall be submitted in writing on the Proposal forms provided by the City of LAKEWOOD (hereinafter "CITY" or "City") available at [city website].

All blank spaces in the bid forms must be correctly filled in and all information requested therein must be clearly and legibly set forth in the manner and form indicated. All spaces for bid prices and lump sum price for which the bid is made, must be filled in, in both words and figures. All prices and notations must be in ink or typewritten. No erasures will be permitted. Mistakes may be crossed out and corrections typed or written in ink adjacent thereto and must be initialed by the person or persons signing the bid. Bidder acknowledges and agrees that by failing to complete the bid forms in their entirety, as set forth above, the CITY may find the Bidder's entire bid non-responsive and may cause the rejection of the Bidder's Proposal at the discretion of the CITY.

2. PROPOSAL GUARANTEE (BID BOND)

In accordance with Public Contract Code Section 20170, Proposals must be accompanied by a Proposal guarantee consisting of either cash, a cashier's check, a certified check or bid bond payable to the CITY in the minimum amount of ten percent (10%) of the total amount bid. Bond's shall be executed by a California admitted insurer with a Best's Rating of A:VII or Better. Any Proposal not accompanied by such a guarantee will not be considered. Within three (3) days after bid opening, the apparent low Bidder must submit a revised bid bond with numerical dollar values, both in words and with digits, for the Bid Bond amount. Within ten (10) working days after the date of the City's formal Notice of Apparent Low Bidder, the successful Bidder will be required to submit the fully executed Contract Agreement, Bonds (Faithful Performance and Payment (Material and Labor)) and Insurance, all meeting the standards of the City. **IF A BIDDER TO WHOM A CONTRACT IS AWARDED FAILS OR REFUSES TO EXECUTE THE CONTRACT DOCUMENTS OR FURNISH THE REQUIRED INSURANCE POLICIES AND BONDS AS SET FORTH IN THOSE DOCUMENTS, THE PROPOSAL GUARANTEE SHALL BE FORFEITED TO THE CITY**. The Proposal guarantees of all Bidders will be held until the successful Bidder has properly executed all Contract Documents.

3. NON-COLLUSION AFFIDAVIT

Bidder shall declare that the only persons or parties interested in the Proposal as principals are those named therein; that no officer, agent, or employee of the CITY is personally interested, directly or indirectly, in the Proposal; that the Proposal is made without connection to any other individual, firm, or corporation making a bid for the same work; and that the Proposal is in all respects fair and without collusion or fraud. The Non-Collusion Affidavit included herein shall be executed and submitted with the Proposal.

4. BID PROPOSAL

Bidders shall give unit prices for each and all of the items set forth. No aggregate bids will be considered. The Bidder shall set forth for each item of work, in clearly legible figures, a unit item price and a total for the item in the respective spaces provided for this purpose. The quantities listed in the Bid sheets are supplied to give an indication of the general scope of work, but the accuracy of figures is not guaranteed and the Bidder shall make his own estimates from the Plans. In case of a variation between the unit price and the totals shown by the Bidder, the unit price will be considered to be the bid. For all Lump Sum Bid Items, the Bidder shall also provide a Schedule of Values.

5. DELIVERY OF PROPOSAL

Proposals shall be submitted in a form, by the due date and by the due time, as specified by City in the Notice Inviting Sealed Bids (may be mailed or delivered by messenger). However, it is the Bidder's responsibility alone to ensure delivery of the Proposal to the hands of the CITY's designated official prior to the bid opening time deadline set forth in the "Notice Inviting Bids." Late Proposals will not be considered and will be returned to the Bidder unopened. (Proposals shall be enclosed in a sealed envelope plainly marked on the outside, "PALMS PARK COMMUNITY CENTER IMPROVEMENTS - DO NOT OPEN WITH REGULAR MAIL."

6. WITHDRAWAL OF PROPOSALS

A Proposal may be withdrawn by a written request signed by the Bidder. Such requests must be delivered to the CITY's designated official prior to the bid-opening time deadline set forth in the "Notice Inviting Bids". The withdrawal of a Proposal will not prejudice the right of the Bidder to submit a new Proposal, provided there is time remaining to do so. Proposals may not be withdrawn after the bid opening date and time without forfeiture of the Proposal guarantee.

7. NONRESPONSIVE PROPOSALS

Unauthorized conditions, limitations, or provisions attached to a Proposal will render it nonresponsive and may cause its rejection. The completed Proposal forms shall be without inter-lineation, alterations, or erasures. Alternative Proposals will not be considered unless specifically requested. No oral, telegraphic, or telephonic Proposal, modification, or withdrawal will be considered.

8. TAXES

No mention shall be made in the Proposal of Sales Tax, Use Tax, or any other Tax, as all amounts bid will be deemed and held to include any such taxes that may be applicable. Bidder acknowledges and agrees that CITY shall not be responsible for the payment of any increase in Sales Tax, Use Tax, or any other Tax that takes effect after award.

9. DISQUALIFICATION OF BIDDERS

In the event that any Bidder acting as a prime contractor has an interest in more than one Proposal, all such Proposals will be rejected, and the Bidder will be disqualified. This restriction does not apply to subcontractors or suppliers who may submit quotations to more than one Bidder.

No contract will be executed unless the Bidder is licensed in accordance with the provisions of the Business and Professions Code.

10. INTERPRETATION OF PLANS AND DOCUMENTS

If any person contemplates submission of a bid for the proposed contract and is in doubt as to the true meaning of any part of the plans, specifications or other proposed contract documents, or finds discrepancies in, or omissions from, the drawings or specifications, he or she may submit to the City Engineer a written request for an interpretation or correction thereof ten (10) working days prior to the scheduled bid opening. The person submitting the request will be responsible for its prompt delivery. Any interpretation or correction of the proposed documents shall be made only by addendum duly issued by City and copy of such addendum will be published and issued to each person receiving a set of such documents. The City Engineer will not be responsible for any other explanation or interpretations of the proposed documents.

11. ADDENDA OR BULLETINS

The effect of all addenda to the Contract Documents shall be considered in the bid, and said addenda shall be made a part of the Contract Documents. Before submitting a bid, each Bidder shall confirm as to whether or not any addenda have been issued, and failure to cover in this bid any such addenda issued, may render the bid non-responsive and may result in its rejection by the CITY.

12. LEGAL RESPONSIBILITIES

All Proposals must be submitted, filed, made, and executed in accordance with State and Federal laws relating to bids for contracts of this nature whether the same are expressly referred to herein or not.

Any Bidder submitting a Proposal shall by such action thereby agree to each and all of the laws, terms, conditions, provisions, and requirements set forth, contemplated, and referred to in the Plans, Specifications, and Contract Documents, and to full compliance therewith.

13. AWARD OF CONTRACT

Following a review of the bids, the CITY shall determine whether to award the contract or to reject all bids. The award of contract, if made, will be to the lowest responsive-responsible Bidder as determined solely by the CITY. At the time of contract award, the successful Bidder shall hold a Class B Contractor's License, as required to perform the work, as issued by the State of California. Additionally, the CITY reserves the right to reject any or all Proposals, to accept any bid or portion thereof, to waive any irregularity, and to take the bids under advisement for the period of time stated in the "Notice Inviting Bids", all as may be required to provide for the best interests of the CITY. In no event will an award be made until all necessary investigations are made as to the responsibility and qualifications of the Bidder to whom the award is contemplated.

No Bidder may withdraw its Proposal for a period of ninety (90) days after the time set for opening thereof. However, the CITY will return all Proposal guarantees within ten (10) days

after the award of the contract or rejection of the bids, as the case may be, to the respective Bidders whose Proposals they accompany.

14. PREVAILING WAGE RATES

The wage rates applicable to this Project are the State of California Department of Industrial Relations prevailing rates of per diem wages and/or the Davis-Bacon Federal wage rates, whichever are higher. In accordance with the provisions of Sections 1773.2 of the California Labor Code, copies of the general prevailing rate of per diem wages as determined by the State Director of Industrial Relations are available on the Internet at the State Department of Industrial Relations website https://www.dir.ca.gov/Public-Works/Prevailing-Wage.html. The Davis-Bacon Federal wage rates are available here: https://sam.gov/content/wage-determinations

It shall be mandatory upon the Contractor to whom the Contract is awarded and upon any subcontractor to pay not less than said specified rates to all workers employed by them in the execution of the Contract. A copy of said rates shall be posted at each job site during the course of construction. The Contractor and all subcontractors shall comply with all provisions of the California Labor Code relating to prevailing wage rates, including Sections 1770–1781.

This Project is subject to compliance monitoring and enforcement by the Department of Industrial Relations. The Department of Industrial Relations shall monitor and enforce compliance with applicable prevailing wage requirements for this Agreement. The reporting requirements may be found at https://www.dir.ca.gov/Public-Works/Contractors.html. The Contractor is responsible for complying with all requirements of the Department of Industrial Relations, including filing electronic payroll reports.

A contractor or subcontractor will not be qualified to bid on, be listed in a Proposal, subject to the requirements of Section 4104 of the Public Contract Code, or engage in the performance of any contract for public work on a public works project unless registered with the Department of Industrial Relations pursuant to Labor Code Section 1725.5. It is not a violation of Labor Code Section 1771.1 for an unregistered contractor to submit a bid that is authorized by Section 7029.1 of the Business and Professions Code or by Section 10164 or 20103.5 of the Public Contract Code, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded. Contractor and its subcontractors shall maintain active registration with the Department of Industrial Relations for the duration of the Project.

A contractor or subcontractor will not be qualified to bid on, be listed in a Proposal, subject to Section 6109 of the public Contract Code, or engage in the performance of any contract for public work on a public works project if the contractor or subcontractor is ineligible to perform work pursuant to Section 1777.1 or 1777.7 of the Labor Code.

The CITY will not recognize any claim for additional compensation because of the payment by the Contractor of any wage rate in excess of the California minimum wage rate or the Federal minimum wage rate (whichever is greater) as set forth in the contract. The possibility of wage increases is one of the elements to be considered by the Bidder in determining his bid, and will not under any circumstances be considered as the basis of a claim against the CITY on the Contract.

The Contractor and subcontractors shall comply with Section 1777.6 of the Labor Code which stipulates that it shall be unlawful to refuse to accept otherwise qualified employees as registered apprentices on any public works on any basis listed in Government Code Section 12940(a), as those bases are defined in Government Code Sections 12926 and 12926.1, except as provided in Labor Code Section 3077 and Government Code Section 12940.

15. WORKERS' COMPENSATION CERTIFICATE

Section 3700 of the Labor Code requires that every employer shall secure the payment compensation by either being insured against liability to pay compensation with one or more insurers or by securing a certificate of consent to self-insure from the State Director of Industrial Relations.

In accordance with this section and with Section 1861 of the Labor Code, the Contractor shall sign a Compensation Insurance Certificate which is included with the Contract Agreement, and submit same to CITY along with the other required Contract Documents, prior to performing any work. Reimbursement for this requirement shall be considered as included in the various items of work.

16. SUBLETTING AND SUBCONTRACTING.

Pursuant to the Subletting and Subcontracting Fair Practices Act (commencing with Section 4100 of the Public Contract Code), Bidders are required to list in their Proposal the name, business address, California contractor license number, and public works contractor registration number issued pursuant to Section 1725.5 of the Labor Code of each subcontractor who will perform work or labor or render services in or about the construction of the work or improvement or a subcontractor who specially fabricates and installs a portion of the work or improvement according to detailed drawings contained in the Plans and Specifications in excess of 1/2 of 1% of this prime Contractor's total bid or $10,000, whichever is greater. If a subcontractor's California contractor license number or public works contractor registration number are submitted incorrectly in the bid, it will not be grounds for filing a bid protest or grounds for considering the bid nonresponsive, if the corrected subcontractor's California contractor license number is submitted to CITY within 24 hours after the bid opening.

If the Bidder fails to list a subcontractor for a portion of work or if the Bidder lists more than one subcontractor of the same portion of work in excess of 1/2 of 1% of the total bid or $10,000, whichever is greater, the Bidder agrees that it is fully qualified to perform that portion of work itself, and that the Bidder shall perform that portion of work itself. If after award of the contract, the Bidder actually subcontracts that portion of work, except as provided in Public Contract Code Section 4107 or 4109, the Bidder shall be subject to the penalties listed in Section 4111 of the Public Contract Code. It is the CITY's intent for the Subletting and Subcontracting Fair Practices Act to apply to all phases of the work.

17. SUBSTITUTION OF SECURITIES

In conformance with Public Contract Code Section 22300, which is incorporated herein by this reference, the Contractor may substitute securities for any monies withheld by the CITY to ensure performance under the Contract or, in the alternative, may request payment of retention earned directly to an escrow agent.

At the request and expense of the Contractor, the Contractor has the option to deposit securities, which have been approved by the CITY, with a State or Federally chartered bank as the escrow agent or require the City to deposit 5% of each progress payment with the escrow agent. Said securities will be used as a substitute for retention earnings required to be withheld by the CITY, pursuant to the construction contract. Said securities shall have no obligation to any other construction contract for substitution of securities in lieu of retention. When the Contractor deposits the CITY approved securities with the escrow agent, the escrow agent shall notify the CITY within 10 calendar days of the deposit. Said securities shall be evaluated quarterly by the escrow agent to verify the current market value. If the current market value of said securities falls below the required amount, the escrow agent shall notify the Contractor and require additional securities and/or cash to be submitted for CITY approval, and be held in the escrow account to meet the Contractor's obligations. The escrow agent shall hold said securities until such time as the escrow agent receives written notification from the CITY that the Contractor has satisfactorily completed his Contract obligations.

The type of securities deposited and the method of release shall be approved by the City Attorney's office.

If the Contractor chooses not to exercise its rights under Public Contract Code Section 22300, the full five percent (5%) retention will be deducted from all payments. The final retention will be authorized for payment thirty-five (35) days after the date of recordation of the Notice of Completion, if no Stop Notices or liens have been filed. The CITY may withhold from release of the final retention amounts authorized under Public Contracts Code Section 7107 and/or 125% of amounts identified in any Stop Notices received by the CITY.

18. BIDDER'S INFORMATION AND QUESTIONNAIRE

Contractor shall complete the Bidder's Information and Questionnaire form in its entirety. Failure to submit the completed questionnaire may be grounds for rejection of the bid.

19. CONTRACTOR'S INDUSTRIAL SAFETY RECORD

All bidders are required to submit information regarding their industrial safety record on the form included in the bid documents. A review of this safety record will be made prior to a determination of the lowest responsible bidder, and an adverse finding as to the bidder's safety record or any bid submitted which does not contain the Contractor's Industrial Safety Record, completed and signed by the appropriate party may be sufficient cause for rejection of the bid.

20. BID DEPOSITORY

In accordance with the terms and provisions of the California Supreme Court in the case of Oakland-Alameda County Builder's Exchange vs. F.P. Lathrop Construction Co., 4 Cal 3rd 354, 93 Cal Rptr 602, find that depository agreements or locked box devices prevented open competitive bidding and that the same was an invalid restraint on competition among subcontractors, the contractor herein bidding certifies that all subcontract bids heretofore obtained or hereafter obtained by it in connection with this project have been or will be obtained on the open market and not subject to any restrictive agreement limiting said bidder to the taking or receiving of bids from any source other than through a locked box or a person or group restricting the receipt of bids outside of said person or group. The bidder is required

to complete Question No. 20 of the Bidder's Questionnaire, attached hereto, which addresses the use of Bid Depositories.

21. IRAN CONTRACTING ACT CERTIFICATION

Pursuant to Public Contract Code (PCC) section 2204, an Iran Contracting Act certification is required for solicitations of goods or services of $1,000,000 or more. As applicable, complete the form attached hereto and return it with the Bid.

22. PUBLIC WORKS CONTRACT

In case of any conflict between the “Public Works Plans and Specifications”, Project Plans and Specifications, and the “Public Works Contract”, the provisions of the Public Works Contract shall prevail.

23. EQUAL EMPLOYMENT AND CONTRACTING OPPORTUNITY

The contractor, subrecipient, or subcontractor shall comply with Equal Employment Opportunity (EEO) requirements as set forth in Executive Order 11246, as amended by Executive Orders 11375, 11478, 12086, and 12107, and their implementing regulations. Contractors must ensure nondiscrimination in hiring, promotion, and subcontracting practices and take affirmative steps to provide equal opportunity in all aspects of employment, regardless of race, color, religion, sex, sexual orientation, gender identity, or national origin.

The prime contractor shall take necessary and reasonable steps to ensure that historically underrepresented groups have the opportunity to participate in the contract. Compliance requires documented outreach, fair recruitment practices, and adherence to affirmative action obligations, as applicable. Contractors must maintain records demonstrating compliance and submit required EEO reports upon request.

Failure to comply with EEO provisions may result in contract termination, debarment, or other enforcement actions.

During the performance of this contract, the contractor agrees as follows:

(1) The contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, sexual orientation, gender identity, or national origin. The contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, sexual orientation, gender identity, or national origin. Such action shall include, but not be limited to the following:

Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

(2) The contractor will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for

employment without regard to race, color, religion, sex, sexual orientation, gender identity, or national origin.

(3) The contractor will not discharge or in any other manner discriminate against any employee or applicant for employment because such employee or applicant has inquired about, discussed, or disclosed the compensation of the employee or applicant or another employee or applicant. This provision shall not apply to instances in which an employee who has access to the compensation information of other employees or applicants as a part of such employee's essential job functions discloses the compensation of such other employees or applicants to individuals who do not otherwise have access to such information, unless such disclosure is in response to a formal complaint or charge, in furtherance of an investigation, proceeding, hearing, or action, including an investigation conducted by the employer, or is consistent with the contractor's legal duty to furnish information.

(4) The contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(5) The contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(6) The contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(7) In the event of the contractor's noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(8) The contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (8) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204 of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance:

Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency, the contractor may request the United States to enter into such litigation to protect the interests of the United States.

The applicant further agrees that it will be bound by the above equal opportunity clause with respect to its own employment practices when it participates in federally assisted construction work: Provided, That if the applicant so participating is a State or local government, the above equal opportunity clause is not applicable to any agency, instrumentality or subdivision of such government which does not participate in work on or under the contract.

The applicant agrees that it will assist and cooperate actively with the administering agency and the Secretary of Labor in obtaining the compliance of contractors and subcontractors with the equal opportunity clause and the rules, regulations, and relevant orders of the Secretary of Labor, that it will furnish the administering agency and the Secretary of Labor such information as they may require for the supervision of such compliance, and that it will otherwise assist the administering agency in the discharge of the agency's primary responsibility for securing compliance.

The applicant further agrees that it will refrain from entering into any contract or contract modification subject to Executive Order 11246 of September 24, 1965, with a contractor debarred from, or who has not demonstrated eligibility for, Government contracts and federally assisted construction contracts pursuant to the Executive Order and will carry out such sanctions and penalties for violation of the equal opportunity clause as may be imposed upon contractors and subcontractors by the administering agency or the Secretary of Labor pursuant to Part II, Subpart D of the Executive Order. In addition, the applicant agrees that if it fails or refuses to comply with these undertakings, the administering agency may take any or all of the following actions: Cancel, terminate, or suspend in whole or in part this grant (contract, loan, insurance, guarantee); refrain from extending any further assistance to the applicant under the program with respect to which the failure or refund occurred until satisfactory assurance of future compliance has been received from such applicant; and refer the case to the Department of Justice for appropriate legal proceedings.

24. BUY AMERICA

Buy America Requirements apply to steel and iron, manufactured products, and construction materials permanently incorporated into the project.

Steel and Iron Materials: All steel and iron materials must be melted and manufactured in the United States except:

1. Foreign pig iron and processed, pelletized, and reduced iron ore may be used in the domestic production of the steel and iron materials;
2. If the total combined cost of the materials produced outside the United States does not exceed 5% of the total project cost.

Furnish steel and iron materials to be incorporated into the work with certificates of compliance and certified mill test reports. Mill test reports must indicate where the steel and iron were melted and manufactured. All melting and manufacturing processes for these materials, including an application of a coating, must occur in the United States. Coating includes all processes that protect or enhance the value of the material to which the coating is applied.

Manufactured Products: Iron and steel used in precast concrete manufactured products must meet the requirements of the above section (Steel and Iron Materials) regardless of the amount used. Iron and steel used in other manufactured products must meet the requirements of the above section (Steel and Iron Materials) if the weight of steel and iron components constitute 90 percent or more of the total weight of the manufactured product.

Construction Materials: Buy America requirements apply to the following construction materials that are or consist primarily of:

1. Non-ferrous metals
2. Plastic and polymer-based products such as: 2.1 Polyvinylchloride 2.2 Composite Building Materials
3. Glass
4. Fiber optic cable (including drop cable)
5. Optical fiber
6. Lumber
7. Engineered wood
8. Drywall

All manufacturing processes for these materials as defined in 2 CFR 184.6 must occur in the United States.

Where one or more of these construction materials have been combined by a manufacturer with other materials through a manufacturing process, Buy America requirements do not apply unless otherwise specified.

Furnish construction materials to be incorporated into the work with certificates of compliance with each project delivery. Manufacturer's certificate of compliance must identify where the construction material was manufactured and attest specifically to Buy America compliance. All manufacturing processes for these materials must occur in the United States.

Buy America requirements do not apply to the following:

1. Tools and construction equipment used in performing the work
2. Temporary work that is not incorporated into the finished project

25. QUALITY ASSURANCE

The Local Agency uses a Quality Assurance Program (QAP) to ensure a material is produced to comply with the Contract. The Local Agency may examine the records and reports of tests the prime contractor performs if they are available at the job site. Schedule work to allow time for QA.

26. PROMPT PAYMENT

FROM THE AGENCY TO THE CONTRACTORS The Local Agency shall make all project progress payment within 30 days after receipt of an undisputed and properly submitted payment request from the Contractor on a construction contract. If the Local Agency fails to pay promptly, the Local Agency shall pay interest to the Contractor, which accrues at the rate of 10 percent per annum on the principal amount of a money judgment remaining unsatisfied and pro-rated as necessary. Upon receipt of the payment request, the Local Agency shall act in accordance with both of the following: 1. The Local Agency shall review each payment request as soon as feasible after receipt to verify it is a proper payment request. 2. The Local Agency must return any payment request deemed improper by the Local Agency to the Contractor as soon as feasible, but not later than seven (7) days, after receipt. A request returned pursuant to this paragraph shall include documentation setting forth in writing the reasons why it is an improper payment request.

27. PROHIBITION OF CERTAIN TELECOMMUNICATIONS AND VIDEO SURVEILLANCE EQUIPMENT AND SERVICES

In response to significant national security concerns, the agency shall check the prohibited vendor list before making any telecommunications and video surveillance purchase because recipients and subrecipients of federal funds are prohibited from obligating or expending loan or grant funds to:

- Procure or obtain;
- Extend or renew a contract to procure or obtain; or
- Enter into a contract (or extend or renew a contract) to procure or obtain equipment, services, or systems that uses covered telecommunications equipment or services as a substantial or essential component of any system, or as critical technology as part of any system.

The prohibited vendors (and their subsidiaries or affiliates) are:

- Huawei Technologies Company;
- ZTE Corporation;
- Hytera Communications Corporation;
- Hangzhou Hikvision Digital Technology Company;
- Dahua Technology Company; and
- Subsidiaries or affiliates of the above-mentioned companies

In implementing the prohibition, the agency administering loan, grant, or subsidy programs shall prioritize available funding and technical support to assist affected businesses, institutions and organizations as is reasonably necessary for those affected entities to transition from covered communications equipment and services, to procure replacement equipment and services, and to ensure that communications service to users and customers is sustained.

The contractors should furnish telecommunications and video surveillance equipment with a certificate of compliance. The certificate must state telecommunications and video surveillance equipment was not procured or obtained from manufacturers identified in the above list.

28. COMPLIANCE WITH LAWS

All services rendered hereunder shall be provided in accordance with all laws and regulations of City and any federal, state or local governmental agency having jurisdiction in effect at the time services are rendered, regardless as to whether the laws and regulations are explicitly stated herein.

BIDDER'S NAME_____

CITY OF LAKEWOOD

BID PROPOSAL
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

TO **CITY OF LAKEWOOD**, as CITY:

In accordance with CITY's "Notice Inviting Sealed Bids", the undersigned BIDDER hereby proposes to furnish all materials, equipment, tools, labor, and incidentals required for the above stated project as set forth in the Plans, Specifications, and Contract Documents therefore, and to perform all work in the manner and time prescribed therein.

BIDDER declares that this Proposal is based upon careful examination of the work site, Plans, Standard Specifications, Notice Inviting Sealed Bids, Instructions to Bidders, Proposal Documents, General Specifications, Special Provisions, Technical Provisions and Contract Documents. If this Proposal is accepted for award, BIDDER agrees to enter into a contract with CITY at the unit and/or lump sum prices set forth in the following Proposal Bid Sheet(s). BIDDER understands that failure to enter into a contract in the manner and time prescribed will result in forfeiture to CITY of the Bid Security accompanying this Proposal.

BIDDER understands that a bid is required for the entire work, that the estimated quantities set forth in the Proposal Bid Sheet are solely for the purpose of comparing bids, and that final compensation under the contract will be based upon the actual quantities of work satisfactorily completed. It is agreed that the unit and/or lump sum prices bid include all appurtenant expenses, taxes, royalties, and fees. In the case of discrepancies in the amounts bid, unit prices shall govern over extended amounts.

BIDDER agrees and acknowledges that it is aware of the provisions of Section 3700 of the Labor Code, which requires every employer to be insured against liability for workers' compensation or to undertake self-insurance in accordance with the provisions of that code, and that the BIDDER will comply with such provisions of that code before the commencement of any work under this Contract, if awarded.

BIDDER certifies that in all previous contracts or subcontracts, all reports which may have been due under the requirements of any CITY, State, or Federal equal employment opportunity orders have been satisfactorily filed, and that no such reports are currently outstanding.

BIDDER declares that the only persons or parties interested in this Proposal as principals are those named herein; that no officer, agent, or employee of the CITY is personally interested, directly or indirectly, in this Proposal; that this Proposal is made without connection to any other individual, firm, or corporation making a bid for the same work; and that this Proposal is in all respects fair and without collusion or fraud.

BIDDER certifies that affirmative action has been taken to seek out and consider disadvantaged business enterprises for those portions of the work to be subcontracted, and that such affirmative actions have been carefully documented, that said documentation is open to inspection, and that said affirmative action will remain in effect for the life of any contract awarded hereunder.

Furthermore, BIDDER certifies that affirmative action will be taken to meet all equal employment opportunity requirements of the contract documents.

BIDDER'S NAME:_____ DATE _____, 20____.

BIDDER'S ADDRESS:_____ BY _____
(Print Name)

_____

_____ _____
(Signature)

PHONE:_(___)_____ TITLE _____

EMAIL: _____

BY _____
(Print Name)

_____
(Signature)

TITLE _____

Subscribed and sworn to before me
this _____ day of _____, 20_____

_____
(Signature of Notary Public)

(SEAL)

BIDDER'S INFORMATION AND QUESTIONNAIRE

BIDDER certifies that the following information is true and correct:

Bidder's Name _____

Business Address _____

Email: _____ Telephone: (____) _____

State Contractor's License No. and Class _____ DIR No. _____

Original Date Issued _____ Expiration Date _____

The following are the names, titles, addresses, and phone numbers of all individuals, firm members, partners, joint ventures, and/or corporate officers having a principal interest in this Proposal:

_____

_____

The dates of any voluntary or involuntary bankruptcy judgments against any principal having an interest in this Proposal are as follows:

_____

All current and prior DBA's, alias, and/or fictitious business names for any principal having an interest in this Proposal are as follows:

_____

Has any Bonding Company ever refused to bond you, your firm, or any principal in your firm for a contract? ☐ YES ☐ NO

Has a Bonding Company ever been required to pay on a Bond issued to you, your firm, or any principal in your firm for a contract? ☐ YES ☐ NO

Have you, your firm, or any principal in your firm ever had to submit to binding arbitration to resolve a dispute arising from a contract? ☐ YES ☐ NO

Have you, your firm, or any principal in your firm ever been penalized with liquidated damages for failure to complete the terms of a contract within the specified time? ☐ YES ☐ NO

By _____
(Print Name)

Subscribed and sworn to before me this _____ day of _____, 20___.

By _____
(Signature)

_____
(Signature of Notary Public)

_____
(Title)

(SEAL)

BIDDER'S NAME _____

LIST OF SUBCONTRACTORS

In accordance with Public Contract Code Section 4100, et seq, BIDDER proposes to subcontract certain portions of the work, and to procure materials and equipment from suppliers and vendors in excess of ½ of 1% of the total bid amount or ten thousand dollars ($10,000), whichever is greater as follows (add additional pages as necessary) (Bidder must include all requested information):

Subcontractor Name_____
Address_____
License No. and Class_____
DIR Registration No._____
Phone No._____ Email:_____
Percent of Total Contract_____
Specific Scope of Work_____
_____

Subcontractor Name_____
Address_____
License No. and Class_____
DIR Registration No._____
Phone No._____ Email:_____
Percent of Total Contract_____
Specific Scope of Work_____
_____

Subcontractor Name_____
Address_____
License No. and Class_____
DIR Registration No._____
Phone No._____ Email:_____
Percent of Total Contract_____
Specific Scope of Work_____
_____

Subcontractor Name_____
Address_____
License No. and Class_____
DIR Registration No._____
Phone No._____ Email:_____
Percent of Total Contract_____
Specific Scope of Work_____
_____

Attach additional sheets as necessary.

BIDDER'S NAME _____

REFERENCES

The following are the names, addresses, and phone numbers for three (3) public agencies for which BIDDER has performed similar work within the past five years:

Agency Name:_____
Address:_____
Contact:._____ Phone:_____
Email: _____
Description of Work_____
_____

Agency Name:_____
Address:_____
Contact:._____ Phone:_____
Email: _____
Description of Work_____
_____

Agency Name:_____
Address:_____
Contact:._____ Phone:_____
Email: _____
Description of Work_____
_____

DESIGNATION OF SURETIES

The following are the names, addresses, and phone numbers for all brokers and sureties from whom BIDDER intends to procure insurance and bonds:

Name_____
Address_____
Phone No._____Email: _____

Name_____
Address_____
Phone No._____Email: _____

Name_____
Address_____
Phone No._____Email: _____

CONTRACTOR'S LICENSING STATEMENT

BIDDER certifies that the following is true and correct. The undersigned is licensed in accordance with the laws of the State of California providing for the registration of Contractors.

Contractor's License Number _____DIR Registration No. _____

Name of Individuals operating as the Contractor (Print or type):

_____

Signature of Owner(s)_____ _____

Business Address _____

OR

Name of Contractor Company _____

Business Address _____

Officers:

Name _____ Title _____

Name _____ Title _____

Name _____ Title _____

OR

Name of Contractor Corporation _____

Business Address _____

Corporation organized under the laws of the State of _____

_____ _____
Name of President of Corp./ Company Name of Secretary of Corp./ Company

By: _____ By: _____
Signature Signature

(Provide a Corporate Resolution designating the individuals authorized to sign agreements.)

Subscribed and sworn to before me
this _____ day of _____, 20____

By:_____ _____
(Signature of Notary Public) (Print Name)

(SEAL)

CITY OF LAKEWOOD
BIDDER'S BOND

PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

NOTE: Use this form when Bid Bond is to be submitted with bid instead of certified check, cashier's check.

KNOW ALL MEN BY THESE PRESENTS,
That we,_____as principal,
Residence Address _____Phone _____
Business Address _____ Phone _____
and _____ a duly authorized corporate surety:
Business Address _____Phone _____are held and firmly bound unto the City of Lakewood, State of California in the sum of _____ dollars, ($_____) for the payment of which sum, well and truly to be made we bind ourselves and each of our heirs, successions, executors, administrators and assigns, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that said principal is about to hand in and submit to the City Council of the City of Lakewood the foregoing bid for the performance of the work therein mentioned, in compliance with the specifications therefor, under an invitation of said City Council contained in the Notice of Inviting Bids attached to said bid.

NOW, THEREFORE, if said bid of the said principal shall be accepted, and the work awarded to thereupon by said City Council, and if the said principal, _____, shall fail or neglect to enter into a contract therefor within the required time, and with a duly authorized corporate surety, conditions for the faithful performance of such contract and the payment of all claims for labor and materials used on said work, in such case required by statute, then in that case the undersigned obligers will pay to the City of Lakewood the full sum of _____Dollars ($_____) as liquidated damages for such failure and neglect.

WITNESS OUR HANDS THIS _____ day of _____, 20 ___.

_____ _____
(Principal's Signature) (Corporate Surety's Signature)

(Attach Acknowlegements)

BIDDERS NAME _____

NON-COLLUSION AFFIDAVIT
TO BE EXECUTED BY BIDDER AND SUBMITTED WITH BID

STATE OF CALIFORNIA)
) SS
COUNTY OF)

In conformance with Public Contract Code Section 7106, the party making the foregoing bid declares that the bid is not made in the interest of, or on behalf of, any undisclosed person, partnership, company, association, organization, or corporation; that such bid is genuine and not collusive or sham; that said Bidder has not directly or indirectly induced or solicited any other Bidder to put in a false or sham bid, and has not directly or indirectly colluded, conspired, connived, or agreed with any Bidder or anyone else to put in a sham bid, or that anyone shall refrain from bidding; that the Bidder has not in any manner, directly or indirectly, sought by agreement, communication, or conference with anyone to fix the bid price of the Bidder or any other Bidder, or to fix any overhead, profit, or cost element of the bid price, or of that of any other Bidder, or to secure any advantage against the public body awarding the contract of anyone interested in the proposed contract; that all statements contained in the bid are true; and further, that the Bidder has not, directly or indirectly, submitted his or her bid price or any breakdown thereof, or the contents thereof, or divulged information or data relative thereto, or paid, and will not pay, any fee to any corporation, partnership, company association, organization, bid depository, or to any member or agent thereof to effectuate a collusive or sham bid.

Any person executing this declaration on behalf of a Bidder that is a corporation, partnership, joint venture, limited liability company, limited liability partnership, or any other entity, hereby represents that he or she has full power to execute, and does execute, this declaration on behalf of the Bidder.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration is executed on _____ [date], at _____ [city], _____ [state]."

Signed:_____

_____

Name:_____

Title: _____

Subscribed and sworn to before me
this _____ day of _____,20____.

_____ _____
Signature of Notary Public Print Name

(SEAL)

EQUAL EMPLOYMENT OPPORTUNITY CERTIFICATION

The Bidder_____,
proposed subcontractor _____, hereby certifies that he has ___ , has not ____, participated in a previous contract or subcontract subject to the equal opportunity clauses, as required by Executive Orders 10925, 11114, or 11246, and that, where required, he has filed with the Joint Reporting Committee, the Director of the Office of Federal Contract Compliance, a Federal Government contracting or administering agency, or the former President's Committee on Equal Employment Opportunity, all reports due under the applicable filling requirements.

Note: The above certification is required by the Equal Employment Opportunity Regulations of the Secretary of Labor (41 CFR 60-1.7(b) (1)), and must be submitted by bidders and proposed subcontractors only in connection with contracts and subcontracts which are subject to the equal opportunity clause. Contracts and subcontracts which are exempt from the equal opportunity clause are set forth in 41 CFR 60-1.5. (Generally only contracts or subcontracts of $10,000 or under are exempt.)

Currently, Standard Form 100 (EEO-1) is the only report required by the Executive Orders or their implementing regulations.

Proposed prime contractors and subcontractors who have participated in a previous contract or subcontract subject to the Executive Orders and have not filed the required reports should note that 41 CFR 60-1.7(b) (1) prevents the award of contracts and subcontracts unless such contractor submits a report covering the delinquent period or such other period specified by the Federal Highway Administration or by the Director, Office of Federal Contract Compliance, U.S. Department of Labor.

[DUPLICATE FORM FOR EACH SUBCONTRACTOR]

BIDDER'S NAME_____

PUBLIC CONTRACT CODE SECTION 10285.1 STATEMENT

In conformance with Public Contract Code Section 10285.1 (Chapter 376, Stats. 1985), the bidder hereby declares under penalty of perjury under the laws of the State of California that the bidder has ___ , has not ____been convicted within the preceding three years of any offenses referred to in that section, including any charge of fraud, bribery, collusion, conspiracy, or any other act in violation of any state or Federal antitrust law in connection with the bidding upon, award of, or performance of, any public works contract, as defined in Public Contract Code Section 1101, with any public entity, as defined in Public Contract Code Section 1100, including the Regents of the University of California or the Trustees of the California State University. The term "bidder" is understood to include any partner, member, officer, director, responsible managing officer, or responsible managing employee thereof, as referred to in Section 10285.1.

Note: The bidder must place a checkmark after "has" or "has not" in one of the blank spaces provided. The above Statement is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Statement. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

PUBLIC CONSTRACT CODE SECTION 10162 QUESTIONNAIRE

In conformance with Public Contract Code Section 10162, the Bidder shall complete, under penalty of perjury, the following questionnaire:

Has the bidder, any officer of the bidder, or any employee of the bidder who has a proprietary interest in the bidder, ever been disqualified, removed, or otherwise prevented from bidding on, or completing a federal, state, or local government project because of a violation of law or a safety regulation?

Yes _____ No _____

If the answer is yes, explain the circumstances in the following space.

BiIDDER'S NAME_____

PUBLIC CONTRACT CODE 10232 STATEMENT

In conformance with Public Contract Code Section 10232, the Contractor, hereby states under penalty of perjury, that no more than one final unappealable finding of contempt of court by a federal court has been issued against the Contractor within the immediately preceding two-year period because of the Contractor's failure to comply with an order of a federal court which orders the Contractor to comply with an order of the National Labor Relations Board.

Note: The above Statement and Questionnaire are part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Statement and Questionnaire. Bidders are cautioned that making a false certification may subject the certifier to criminal prosecution.

BIDDER'S NAME_____

DEBARMENT AND SUSPENSION CERTIFICATION

TITLE 49, CODE OF FEDERAL REGULATIONS, PART 29

The bidder, under penalty of perjury, certifies that, except as noted below, he/she or any other person associated therewith in the capacity of owner, partner, director, officer, manager:

- is not currently under suspension, debarment, voluntary exclusion, or determination of ineligibility by any Federal agency;
- has not been suspended, debarred, voluntarily excluded or determined ineligible by any Federal agency within the past 3 years;
- does not have a proposed debarment pending; and
- has not been indicted, convicted, or had a civil judgment rendered against it by a court of competent jurisdiction in any matter involving fraud or official misconduct within the past 3 years.

If there are any exceptions to this certification, insert the exceptions in the following space.

_____

_____

_____

_____

Exceptions will not necessarily result in denial of award, but will be considered in determining bidder responsibility. For any exception noted above, indicate below to whom it applies, initiating agency, and dates of action.

Notes: Providing false information may result in criminal prosecution or administrative sanctions. The above certification is part of the Proposal. Signing this Proposal on the signature portion thereof shall also constitute signature of this Certification.

BIDDER'S NAME_____

NONLOBBYING CERTIFICATION FOR FEDERAL-AID CONTRACTS

The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

(l) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure of Lobbying Activities," in conformance with its instructions.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed $100,000 and that all such subrecipients shall certify and disclose accordingly.

DISCLOSURE OF LOBBYING ACTIVITIES

COMPLETE THIS FORM TO DISCLOSE LOBBYING ACTIVITIES PURSUANT TO 31 U.S.C. 1352

1. Type of Federal Action:

☐ a. contract
b. grant
c. cooperative agreement
d. loan
e. loan guarantee
f. loan insurance

2. Status of Federal Action:

☐ a. bid/offer/application
b. initial award
c. post-award

3. Report Type:

☐ a. initial
b. material change

For Material Change Only:
year ____ quarter _____
date of last report_____

4. Name and Address of Reporting Entity

☐ Prime ☐ Subawardee
Tier_____ , if known

Congressional District, if known

5. If Reporting Entity in No. 4 is Subawardee, Enter Name and Address of Prime:

Congressional District, if known

6. Federal Department/Agency:

7. Federal Program Name/Description:

CFDA Number, if applicable _____

8. Federal Action Number, if known:

9. Award Amount, if known:

10. a. Name and Address of Lobby Entity
(If individual, last name, first name, MI)

b. Individuals Performing Services (including address if different from No. 10a)
(last name, first name, MI)

(attach Continuation Sheet(s) if necessary)

11. Amount of Payment (check all that apply)

$ _____ ☐ actual ☐ planned

12. Form of Payment (check all that apply):

☐ a. cash
☐ b. in-kind; specify: nature_____
value _____

13. Type of Payment (check all that apply)

☐ a. retainer
☐ b. one-time fee
☐ c. commission
☐ d. contingent fee
☐ e deferred
☐ f. other, specify _____

14. Brief Description of Services Performed or to be performed and Date(s) of Service, including officer(s), employee(s), or member(s) contacted, for Payment Indicated in Item 11:

(attach Continuation Sheet(s) if necessary)

15. Continuation Sheet(s) attached: Yes ☐ No ☐

16. Information requested through this form is authorized by Title 31 U.S.C. Section 1352. This disclosure of lobbying reliance was placed by the tier above when his transaction was made or entered into. This disclosure is required pursuant to 31 U.S.C. 1352. This information will be reported to Congress semiannually and will be available for public inspection. Any person who fails to file the required disclosure shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each such failure.

Signature:_____

Print Name: _____

Title: _____

Telephone No.:_____ Date:_____

Authorized for Local Reproduction
Standard Form - LLL

Federal Use Only:

INSTRUCTIONS FOR COMPLETION OF SF-LLL, DISCLOSURE OF LOBBYING ACTIVITIES

This disclosure form shall be completed by the reporting entity, whether subawardee or prime Federal recipient, at the initiation or receipt of covered Federal action or a material change to previous filing pursuant to title 31 U.S.C. section 1352. The filing of a form is required for such payment or agreement to make payment to lobbying entity for influencing or attempting to influence an officer or employee of any agency, a Member of Congress an officer or employee of Congress or an employee of a Member of Congress in connection with a covered Federal action. Attach a continuation sheet for additional information if the space on the form is inadequate. Complete all items that apply for both the initial filing and material change report. Refer to the implementing guidance published by the Office of Management and Budget for additional information.

1. Identify the type of covered Federal action for which lobbying activity is and/or has been secured to influence, the outcome of a covered Federal action.
2. Identify the status of the covered Federal action.
3. Identify the appropriate classification of this report. If this is a follow-up report caused by a material change to the information previously reported, enter the year and quarter in which the change occurred. Enter the date of the last, previously submitted report by this reporting entity for this covered Federal action.
4. Enter the full name, address, city, state and zip code of the reporting entity. Include Congressional District if known. Check the appropriate classification of the reporting entity that designates if it is or expects to be a prime or subaward recipient. Identify the tier of the subawardee, e.g., the first subawardee of the prime is the first tier. Subawards include but are not limited to subcontracts, subgrants and contract awards under grants.
5. If the organization filing the report in Item 4 checks "Subawardee" then enter the full name, address, city, state and zip code of the prime Federal recipient. Include Congressional District, if known.
6. Enter the name of the Federal agency making the award or loan commitment. Include at least one organization level below agency name, if known. For example, Department of Transportation, United States Coast Guard.
7. Enter the Federal program name or description for the covered Federal action (item 1). If known, enter the full Catalog of Federal Domestic Assistance (CFDA) number for grants, cooperative agreements, loans and loan commitments.
8. Enter the most appropriate Federal identifying number available for the Federal action identification in item 1 (e.g., Request for Proposal (RFP) number, Invitation for Bid (IFB) number, grant announcement number, the contract grant. or loan award number, the application/proposal control number assigned by the Federal agency). Include prefixes, e.g., "RFP-DE-90-001."
9. For a covered Federal action where there has been an award or loan commitment by the Federal agency, enter the Federal amount of the award/loan commitments for the prime entity identified in item 4 or 5.
10. (a) Enter the full name, address, city, state and zip code of the lobbying entity engaged by the reporting entity identified in item 4 to influenced the covered Federal action.
    (b) Enter the full names of the individual(s) performing services and include full address if different from 10 (a). Enter Last Name, First Name and Middle Initial (MI).
11. Enter the amount of compensation paid or reasonably expected to be paid by the reporting entity (item 4) to the lobbying entity (item 10). Indicate whether the payment has been made (actual) or will be made (planned). Check all boxes that apply. If this is a material change report, enter the cumulative amount of payment made or planned to be made.
12. Check the appropriate box. Check all boxes that apply. If payment is made through an in-kind contribution, specify the nature and value of the in-kind payment.
13. Check the appropriate box. Check all boxes that apply. If other, specify nature.
14. Provide a specific and detailed description of the services that the lobbyist has performed or will be expected to perform and the date(s) of any services rendered. Include all preparatory and related activity not just time spent in actual contact with Federal officials. Identify the Federal officer(s) or employee(s) contacted or the officer(s) employee(s) or Member(s) of Congress that were contacted.
15. Check whether or not a continuation sheet(s) is attached.
16. The certifying official shall sign and date the form, print his/her name title and telephone number.

Public reporting burden for this collection of information is estimated to average 30 minutes per response, including time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the Office of Management and Budget, Paperwork Reduction Project (0348-0046), Washington, D.C. 20503.SF-LLL-Instructions Rev. 06-04-90«ENDIF»

SECTION 3 REQUIREMENTS

Applicable when HUD/CDBG contribution exceeds $200,000

The bidder/proposer must declare an intent to comply with Section 3 requirements, including benchmarks, in order to be a responsive bidder/proposer eligible for contract award.

The work to be performed under this Contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u. The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

The bidders/proposers are required to complete and submit the Declaration of Intent to Comply with Section 3 Requirements certifying that they intend to comply with the Section 3 provisions as defined in Section 8.43 (Section 3 of the Housing and Urban Development Act of 1968, as amended). Further, bidders/proposers are required to comply with these requirements for the term of any contract awarded pursuant to this solicitation.

Prospective bidders/proposers should carefully review Section 3 requirements, including *Contract Notices and Section 3 Provisions for Housing and Community Development Assistance and Public Housing Assistance, as applicable*. Proposals that fail to comply with the requirements of Section 3 will be considered non-responsive and excluded from further consideration.

The Section 3 Clause and the Federal Labor Standards Provisions Form HUD-4010 shall be inserted in all contracts and subcontracts.

DECLARATION OF INTENT TO COMPLY WITH SECTION 3 REQUIREMENTS

As a minimum requirement for consideration of contract award, bidders/proposers shall declare their intent to comply with Section 3 (24 CFR 75) of the Housing and Urban Development Act of 1968, as amended. The bidder/proposer is obliged, to the greatest extent feasible, to give opportunities for training and employment to low-income and very low-income persons residing in the service area or neighborhood in which the covered Section 3 project/service is located, and/or to award subcontracts to other Section 3 business concerns that provide economic opportunities for Section 3 workers and Targeted Section 3 workers.

The undersigned bidder/proposer agrees that, as a condition of responsiveness to the solicitation and prior to recommendation for contract award, they will agree to comply with the Section 3 requirements by including the Section 3 contract language in the contract, by meeting the Section 3 benchmarks to the greatest extent feasible, and by reporting all accomplishments and providing all required documentation on a quarterly basis for the duration of the contract.

The Section 3 benchmarks apply to all Section 3 covered contracts as follows:

- Section 3 workers: 25% or more of the total number of labor hours worked by all workers employed on a Section 3 project; and

- Targeted Section 3 workers: 5% or more of the total number of labor hours worked by all workers employed on a Section 3 project (included as part of the 25% Section 3 worker benchmark above)

Failure to agree to comply with the Section 3 requirements and reporting obligations shall be grounds for determining the bidder/proposer non-responsive, and no further consideration for contract award shall be granted.

I declare under penalty of perjury under the laws of the State of California that we agree to comply with the Section 3 requirements as stated above.

Name of Contractor/Subcontractor	Address
Print Name	Title
Signature	Date

SECTION 3 BUSINESS CONCERN CERTIFICATION

Business Name: _____

Address: _____

City/State/Zip Code: _____

Telephone Number: _____ Email Address: _____

This business is a Section 3 business concern based on one of the following categories, as documented:

☐ **A. Business is 51% or more owned by low- or very low-income persons**

(Attach a Section 3 Worker Certification for each owner to this certification.)

☐ **B. Over 75 percent (75%) of the labor hours performed for the business over the prior three-month period are performed by Section 3 workers**

Provide the following information for the prior three-month period:

- Indicate total number of labor hours performed by Section 3 workers: Hours
- Indicate total number of labor hours performed by all workers: Hours
- Calculate the percentage of labor hours by Section 3 workers: _____ %

(Attach the Section 3 Worker Certifications and Section 3 Labor Hours Reports.)

or

☐ **C. Business is 51% or more owned and controlled by current public housing residents or residents who currently live in Section 8-assisted housing.**

(Attach proof of public housing or Section 8-assisted housing residence.)

(NOTE: FAILURE OF THE BUSINESS TO PROVIDE THE REQUIRED DOCUMENTATION AS NOTED ABOVE SHALL BE GROUNDS FOR THE BUSINESS TO BE DETERMINED TO BE A NON-SECTION 3 BUSINESS CONCERN.)

I declare under penalty of perjury under the laws of the State of California that the information stated above is true and correct.

_____ _____ _____

Signature Title Date

TO BE COMPLETED BY AWARDING AGENCY

This business meets the following category:
☐ 51% owned by low- or very low-income persons
☐ 75% of labor hours performed by Section 3 workers
☐ 51% owned and controlled by public housing or Section 8-assisted housing residents

Approved by (print name): _____ Signature: _____ Date: _____

BIDDER'S NAME_____

CITY OF LAKEWOOD
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

CONTRACTOR'S INDUSTRIAL SAFETY RECORD

This information must include all construction work undertaken in the State of California by the bidder and any partnership, joint venture or corporation that any principal of the bidder participated in as a principal or owner for this last five calendar years and the current calendar year prior to the date of bid submittal. Separate information shall be submitted for each particular partnership, joint venture, corporate or individual bidder. The bidder may attach any additional information or explanation of data which he would like taken into consideration in evaluating the safety record. An explanation must be attached of the circumstances surrounding any and all fatalities. **This form may be duplicated.**

		2021	2022	2023	2024	2025
1.	Number of contracts					
2.	Total dollar amount of contracts(in $1,000's)					
*3.	Number of fatalities					
*4.	Number of lost workday cases					
*5.	Number of lost workday cases involving permanent transfer to another job or termination of employment					
*6.	Number of lost workdays					

*The information required for these items is the same as required for columns 3 to 6, code 10, Occupational Injuries, Summary--Occupational Injuries and Illnesses, OSHA No. 102.

The above information was compiled from the records that area available to us at this time and I declare under penalty of perjury that the information is true and accurate within the limitations of those records.

Name of Business Entity:_____

Relationship to Bidder: _____

Address:_____

Telephone _____ Email _____

State Contractor's License Number _____ Additional Information Attached? _____

Date _____ Signature _____

BIDDER'S NAME_____

CITY OF LAKEWOOD
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

IRAN CONTRACTING ACT CERTIFICATION

Pursuant to Public Contract Code (PCC) section 2204, an Iran Contracting Act certification is required for solicitations of goods or services of $1,000,000 or more.

To submit a bid or proposal to the Court, you must complete **ONLY ONE** of the following two paragraphs. To complete paragraph 1, check the corresponding box **and** complete the certification for paragraph 1. To complete paragraph 2, simply check the corresponding box.

☐ 1. We are not on the current list of persons engaged in investment activities in Iran created by the California Department of General Services ("DGS") pursuant to PCC 2203(b), and we are not a financial institution extending twenty million dollars ($20,000,000) or more in credit to another person, for 45 days or more, if that other person will use the credit to provide goods or services in the energy sector in Iran and is identified on the current list of persons engaged in investment activities in Iran created by DGS.

OR

☐ 2. We have received written permission from the Court to submit a bid or proposal pursuant to 2203(c) or (d). *A copy of the written permission from the Court is included with our bid or proposal.*

CERTIFICATION FOR PARAGRAPH 1:

I, the official named below, CERTIFY UNDER PENALTY OF PERJURY, that I am duly authorized to legally bind the proposer/bidder to the clause in paragraph 1. This certification is made under the laws of the State of California.

Company Name (Printed)	*Federal ID Number*
By (Authorized Signature)	
Printed Name and Title of Person Signing	
Date Executed	*Executed in the County of _____ in the State of _____*

BIDDER'S NAME_____

CITY OF LAKEWOOD

PROPOSAL BID SHEETS
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

BASE BID

Item	Description	Quantity	Units	Unit Price $	Total Cost $
1	Renovation of the Palms Park Community Center to include interior and exterior improvements in accordance with the Project Plans, Specifications and Contract Documents.	1	LUMP SUM		

TOTAL BASE BID IN FIGURES: $_____

TOTAL BASE BID IN WORDS:

_____DOLLARS

AND_____CENTS.

NOTES:

1. THE QUANTITIES SHOWN HEREIN ARE APPROXIMATE AND ARE TO BE USED ONLY FOR BID COMPARISON. PAYMENT FOR QUANTITIES WILL BE MADE FOR ACTUAL MATERIALS USED ON THE PROJECT EXCEPT FOR LUMP SUM BID ITEMS. LUMP SUM BID ITEMS ARE DEEMED TO BE FULLY INCLUSIVE OF ALL QUANTITIES REQUIRED TO PERFORM THE WORK. THE CITY RESERVES THE RIGHT TO INCREASE OR DECREASE THE AMOUNT OF ANY QUANTITY SHOWN AND TO DELETE ALL OR ANY ITEM FROM THE CONTRACT. IF THERE IS A CONFLICT BETWEEN THE UNIT PRICE PROVIDED AND TOTAL COST, THE UNIT PRICE SHALL PREVAIL. IF THERE IS A CONFLICT BETWEEN THE "TOTAL BID FIGURES" AND THE "TOTAL BID IN WORDS", THE "TOTAL BID IN WORDS" SHALL PREVAIL.

2. BID COMPARISON SHALL SOLELY BE ON THE BASIS OF THE BASE BID.

3. **BIDDER SHALL COMPLETE THE SCHEDULE OF VALUES FOR EACH BID PROVIDED ON THE PAGES FOLLOWING THE PROPOSAL BID SHEETS.**

BIDDER'S NAME_____

CITY OF LAKEWOOD

BASE BID SCHEDULE OF VALUES
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

BASE BID

ITEM NO.	DIVISION/ PLAN REF.	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE
01	Division 01	General Requirements	1	LS	
02	Division 02	Existing Conditions	1	LS	
03	Division 03	Concrete	1	LS	
04	Division 04	Masonry	1	LS	
05	Division 05	Metals	1	LS	
06	Division 06	Wood, Plastics, and Composites	1	LS	
07	Division 07	Thermal and Moisture Protection	1	LS	
08	Division 08	Openings	1	LS	
09	Division 09	Finishes	1	LS	
10	Division 10	Specialties	1	LS	
11	Division 12	Furnishings	1	LS	
12	Division 21	Fire Protection	1	LS	
13	Division 22	Plumbing	1	LS	
14	Division 23	HVAC	1	LS	
15	Division 26	Electrical	1	LS	
16	Division 27	Communications	1	LS	
17	Division 28	Electronic Safety and Security	1	LS	
18	Division 31	Earthwork	1	LS	
19	Division 32	Exterior Improvements	1	LS	
20	Division 33	Utilities	1	LS	

TOTAL BASE BID IN FIGURES: $_____

CITY OF LAKEWOOD

PROPOSAL BID SHEETS CONTINUED
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

PROPOSAL

IN WITNESS WHEREOF, BIDDER executes and submits this Proposal with the names, titles, hands, and seals of all forenamed principals this _____ day of _____, 20___.

BIDDER _____

_____

Subscribed and sworn to before me this _____ day of _____, 20____.

SIGNATURE NOTARY PUBLIC _____ (Attach Acknowledgement)

By_____
(PRINT)

_____
(SIGNATURE)

(SEAL)

Title_____

NOTE: THE QUANTITIES SHOWN HEREIN ARE APPROXIMATE AND ARE TO BE USED ONLY FOR BID COMPARISON. PAYMENT FOR QUANTITIES WILL BE MADE FOR ACTUAL MATERIALS USED ON THE PROJECT EXCEPT FOR LUMP SUM BID ITEMS. LUMP SUM BID ITEMS ARE DEEMED TO BE FULLY INCLUSIVE OF ALL QUANTITIES REQUIRED TO PERFORM THE WORK. THE CITY RESERVES THE RIGHT TO INCREASE OR DECREASE THE AMOUNT OF ANY QUANTITY SHOWN AND TO DELETE ALL OR ANY ITEM FROM THE CONTRACT. IF THERE IS A CONFLICT BETWEEN THE UNIT PRICE PROVIDED AND TOTAL COST, THE UNIT PRICE SHALL PREVAIL. IF THERE IS A CONFLICT BETWEEN THE "TOTAL BID FIGURES" AND THE "TOTAL BID IN WORDS", THE "TOTAL BID IN WORDS" SHALL PREVAIL. BID COMPARISON SHALL SOLELY BE ON THE BASIS OF THE BASE BID.

CONTINUED NEXT PAGE

CITY acknowledges that this Proposal was received and opened at the time and in the place specified, and that it was accompanied by the required guarantee in the minimum amount of ten percent (10%) of the total bid.

By _____
Title _____

BIDDER'S NAME _____

CITY OF LAKEWOOD
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

BIDDER'S ACKNOWLEDGEMENT OF INSURANCE REQUIREMENTS

BIDDER agrees, acknowledges and is fully aware of the insurance requirements as specified in the SPECIAL PROVISIONS for PALMS PARK COMMUNITY CENTER IMPROVEMENTS and accepts all conditions and requirements contained therein. Provide the following information and execute this form, submit with Bid.

Name of Agent:	Name of Agent:
Name of Firm:	Name of Firm:
Address:	Address:
Telephone: Email:	Telephone: Email:
Type of Insurance:	Type of Insurance:
Insurance Company:	Insurance Company:
AM Best's Rating:	AM Best's Rating:

_____
Bidder's Name

_____ _____
By(Signature and Title) Date

SUBMIT THIS EXECUTED FORM WITH THE BID

CITY OF LAKEWOOD

PRECONSTRUCTION DOCUMENT SUBMITTAL REQUIREMENTS
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

The following documents are required to be completed and submitted as indicated.

A. Submit with Bid (all bidders)
1. Proposal Submission Statement
2. Bidder's Information and Questionnaire
3. List of Subcontractors
4. References and Designation of Sureties
5. Contractor's Licensing Statement
6. Bidder's Bond or Security
7. Non-Collusion Affidavit
8. Equal Employment Opportunity Certification
9. PCC 10285.1 Statement and PCC 10162 Questionnaire
10. PCC 10232 Statement
11. Debarment and Suspension Certification
12. Nonlobbying Certification for Federal-Aid Contracts
13. Disclosure of Lobbying Activities
14. Section 3 Declaration of Intent to Comply
15. Section 3 Business Concern Certification
16. Contractor's Industrial Safety Record
17. Iran Contracting Act Certification for bids of $1,000,000 or more.
18. Proposal Bid Sheets
19. Schedule of Values Sheets
20. Bidder's Acknowledgement of Insurance Requirements

B. Submit with Agreement (Awardee):
1. Contract Agreement
2. Faithful Performance Bond - executed by an admitted surety insurer
3. Payment (Material and Labor) Bond - executed by an admitted surety insurer
4. Certificate of Insurance for Public Liability and Property Damage. **Note the minimum limits of $5,000,000**
5. Certificate of Insurance for Worker's Compensation
6. Manufacturer's specifications and data sheets for "or equal" items proposed to be furnished

C. Submit Prior to Starting Construction, as applicable, by the Awardee:
1. Shop drawings, Suubmittals, Shoring Plans, Falsework Plans, Traffic Control Plan, etc. (as required)
2. Schedule Updates
3. Permits
4. Construction Waste Management Plan
5. Other requirements per the Plans and Specifications

CITY OF LAKEWOOD

SAMPLE PUBLIC WORKS CONTRACT

PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

WHEREAS, the City of Lakewood has heretofore invited bids for a public works contract for:

PALMS PARK COMMUNITY CENTER IMPROVEMENTS, PROJECT NO. PW23-01

within the City of Lakewood in accordance with the terms and provisions of this agreement; and

WHEREAS, the City Council of the City of Lakewood at a meeting thereof on the _____ day of _____, 20_____, found that the lowest responsible bidder was and accepted the bid of said bidder, sometimes hereinafter referred to as "Contractor", to construct said public works project in accordance with this agreement; and

WHEREAS, the Notice Inviting said Bids requires the successful bidder to execute an agreement with the City for construction of said public works;

NOW, THEREFORE, the City of Lakewood and said Contractor do hereby covenant and agree as follows:

1. Parties

   a. City of Lakewood, a municipal corporation, 5050 Clark Avenue, Lakewood, California, and all officers and employees thereof, as well as any contractual agent of the City and the employees of said contractual agency performing any function of said public works project by and on behalf of the City of Lakewood.

   b. "Contractor" shall mean

   Name:

   Address:

   Telephone: _____ Email: _____
   and all agents and employees and subcontractors, and the agents and employees of the subcontractors of said Contractor.

2. Scope of Work

   a. Contractor agrees at his own cost and expense to do all the work and furnish all the materials, except such as are mentioned in the specifications to be furnished by said City, necessary to construct and complete in a good workmanlike, and substantial manner, the following described public works project in accordance with the project plans and specifications and the provisions of this agreement

which are hereby specially referred to and by reference made a part hereof. The scope of said work and said public works project is:

Palms Park Community Center Improvements: The work is comprised of a comprehensive renovation to enhance both exterior and interior. Exterior renovations include, but are not limited to, the replacement of HVAC rooftop units, roof refinishing, skylight infill, parking lot accessibility upgrades, and updated exterior building signage. Interior renovations include, but are not limited to, improving accessibility across all spaces, reconfiguring interior layouts to better support senior programs, and modernizing with refreshed finishes, fixtures, equipment, and furniture throughout. Removal of indoor planter and existing decorative wood trusses to open the interior, with the reclaimed wood being repurposed into planter boxes for the facility's community garden, and other miscellaneous improvements as shown on the Plans, described in the Specifications, and as required to complete the work.

b. The City hereby promises and agrees with said Contractor to employ, and does hereby employ, said Contractor to provide the materials and do the work according to the terms and conditions herein contained and referred to, for the prices hereinafter set forth, and hereby contracts to pay the same at the time, in the manner and upon the conditions hereinafter set forth.

3. Contract Price

The said Contractor agrees to receive and accept the following prices as full compensation for furnishing all materials and for doing all the work contemplated and embraced in this agreement; also for all loss or damage arising out of the nature of the aforesaid work, or from the action of the elements, or from any unforeseen difficulties or obstructions which may arise or be encountered in the prosecution of the work (acts of God as hereinafter defined excepted) until its acceptance by said City, and for all expenses incurred, or as a consequence of the suspension or discontinuance of the work; and for well and faithfully completing the work, and the whole thereof in the manner according to the plans and specifications thereof and this agreement, the sum of _____ Dollars ($_____). Said price is determined by the unit prices contained in the Contractor's bid. In the event that more or less work is performed than is set forth in Contractor's bids and the specifications herein, such work and materials will be paid for (where authorized by the City) at the unit prices therein contained or a negotiated lump sum or at time and materials. Said amount shall be paid in installments as hereinafter provided.

4. Payments to Contractor

Each month during the progress of the work, the Contractor shall submit to the City a complete itemized statement of all work completed during the preceding month, and the portion of the contract sum applicable thereto. The Engineer will, after award of contract, establish closure dates for the purpose of making monthly progress payments. Said statement will be submitted to the next succeeding City Council meeting corresponding to the closure cut-off date for audit and approval by the City Council, and the City shall pay Contractor said sum less five percent (5%), which five percent (5%) the City will retain as part security for the fulfillment of the contract by the Contractor, said sum not exceeding ninety-five percent (95%) of the contract price during the term of said contract.

The remaining five percent (5%) thereof shall be paid Contractor thirty-five (35) days after recording of the Notice of Completion. If the Notice of Completion or the Notice of Cessation of work has not been recorded, no such final payment shall be made until ninety (90) days after completion or cessation. At the request and expense of the Contractor, where the provision of Section 22300 of the Public Contracts Code is applicable, the amount so withheld will be paid to the Contractor, provided securities equivalent to the amount withheld are deposited with the City in accordance with and subject to the terms and provisions of Section 22300 of the Public Contract Code.

Nothing herein shall require the City to make payment to the Contractor contrary to the terms and provisions of the Works of Improvement Law, Sections 3082-3266 of the Civic Code pertaining to stop notices and enforcement.

5. Time for Performance

The construction or installation or work called for herein shall commence within fifteen (15) calendar days after issuance of a Notice to Proceed, and shall be thereafter diligently prosecuted to completion. Time is the essence of this agreement.

All work shall be completed within **110 working days**, which includes the 15 day mobilization period.

6. Worker's Compensation Insurance

By my signature hereunder as Contractor, I certify that I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Worker's Compensation, or to undertake self-insurance in accordance with the provisions of that Code, and have attached a Certificate of Insurance of Workman's Compensation.

7. Assignment

The Contractor shall not assign this contract, or transfer his obligation to perform this agreement, without the written approval of the City.

8. Sub-Let

The Contractor shall not sub-let or sub-contract any portion of the work in excess of one-half of one percent (0.5%) of the Contractor's total bid or ten thousand ($10,000) dollars, whichever is greater, for which he did not designate a subcontractor, other than in the performance of change orders.

9. The Contract

The "Contract", or "Agreement", or "Public Works Contract" used herein shall consist of:

(1) This Agreement;
(2) The Notice Inviting Bids;
(3) The Instructions to Bidders and the Bid Form including all affidavits and questionnaires pertaining thereto and included within the "Bidder's Package";

(4) The prevailing per diem wage scale rates and benefits established by the Department of Industrial Relations of the State of California;
(5) The Davis-Bacon Federal Wage Rates;
(5) The Bidder's Security, the Contractor's Payment Bond, and the Faithful Performance Bond;
(6) The contract Plans and Specifications, and revisions and addenda issued thereto;

Execution of this Agreement by the Contractor incorporates all of the aforementioned by reference, which are attached hereto and made a part hereof as though set forth in full.

10. Bonds and Insurance

The Contractor shall return with this executed Contract those bonds and evidence of insurance in the amounts as set forth in the Contract General Conditions. Said bonds and evidence of insurance shall be in a form approved by the City Attorney.

It is further agreed by and between the parties hereto, including the surety or sureties on the bonds made a part of this agreement, that in the event it is deemed necessary to extend the time of completion of the work to be done under this Agreement, said extension may be granted by the City Council, and shall in no way affect the validity of this Contract, or release of surety or sureties of the bonds.

Where cash is provided by the Contractor to the City to secure performance of this Agreement, and where not prohibited by federal law or regulation, securities in compliance with the provisions of Public Contract Code Section 22300, equivalent in the amount withheld, may be deposited with the City or with a state or federally chartered bank as the escrow agent, who shall then pay such money withheld from the contractor. Upon satisfactory completion of the contract, the securities shall be returned to the contractor and otherwise retained and administered within the terms and provisions of the Agreement and Section 22300.

11. Contracts for Thirty Thousand ($30,000) dollars or more, or Twenty Working (20) Days or More:

It is understood and agreed by and between the parties that in accordance with the terms and provisions of Section 3098 of the Labor Code of the State of California, the City will, with respect to prime contracts of thirty thousand ($30,000) dollars or twenty (20) working days or more, within five (5) days of the award of this contract send a copy of the award to the Division of Apprentice Standards of the State of California. Contractor agrees by the execution of this agreement to comply with the terms and provisions of Section 1777.5 of the Labor Code pertaining to the employment of properly indentured apprentices and the wages to be paid.

12. HUD (CDBG and CPF) Compliance Provisions for Construction Contracts

The HUD Compliance Provisions for Construction Contracts, attached hereto as Exhibit A, are hereby incorporated herein.

13. Minimum Federal Wage Rates Determination

The Minimum Federal Wage Rates Determination (Davis-Bacon Wage Rates) is hereby physically attached, in conformance with federal 10-day rule, as a part of this contract as Exhibit

B. This wage rate determination applies to federal-aid contracts and all work performed exceeding $2000 by subcontracts and subsequent lower-tier subcontracts and required be physically included in each executed contract. In case of a difference in wage rates between the Federal and the California wage rates, the higher rate shall prevail.

14. California Prevailing Rate or Wages

The Director of Public Works at the direction of the City Council has obtained from the Department of Industrial Relations, State of California, the prevailing rate of per diem wage, and the general prevailing rate for holiday and overtime work in the locality in which this work is to be performed for each craft, classification or type or workmen needed to carry out this agreement. In that regard, pursuant to Section 1773 of the Labor Code, holidays, upon which such rate shall be paid, need not be specified in this agreement, but shall be all holidays recognized in the collective bargaining agreement applicable to the particular craft, classification or type or workmen employed on the project. Attached hereto and made a part hereof as though set forth in full are rates applicable to this project and contract, and the contractor shall pay not less than the minimum thereof. In case of a difference in wage rates between the Federal and the California wage rates, the higher rate shall prevail.

[Signatures Next Page]

IN WITNESS WHEREOF the City and the Contractor have caused this Agreement to be executed and signed on this _____day of _____, 20_____.

CITY OF LAKEWOOD

By_____
Mayor

CONTRACTOR

_____
Name of Contractor

By_____
Signature & Title

EXHIBIT A
HUD COMPLIANCE PROVISIONS
for
CONSTRUCTION CONTRACTS
(These provisions must be included in all construction contracts)

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2. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS

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4. CERTIFICATION OF NONSEGREGATED FACILITIES

5. CIVIL RIGHTS

6. SECTION 109 OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974

7. SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968 - COMPLIANCE IN THE PROVISION OF TRAINING, EMPLOYMENT AND BUSINESS OPPORTUNITIES

8. SECTION 503 OF THE REHABILITATION ACT OF 1973 (29 USC 793)

9. SECTION 504 OF THE REHABILITATION ACT OF 1973, AS AMENDED

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11. CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS

12. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY STANDARDS AND ACCIDENT PREVENTION

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19. PATENTS
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39. FEDERAL LABOR STANDARDS PROVISIONS

1. EQUAL EMPLOYMENT OPPORTUNITY (Equal Opportunity Clause)
(applicable to contracts and subcontracts above $10,000)

During the performance of this contract, the Contractor agrees as follows:

A. The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.

B. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration without regard to race, color, religion, sex, or national origin.

C. The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or other contract or understanding, a notice to be provided by the Contract Compliance Officer advising the said labor union or workers' representatives of the Contractor's commitment under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

D. The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor.

E. The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, as amended, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the Department and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and others.

F. In the event of the Contractor's noncompliance with the non-discrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be cancelled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

G. The Contractor will include the provisions of the sentence immediately preceding paragraph A and the provisions of paragraphs A through G in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order

as the Department may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event a contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the Department, the Contractor may request the United States to enter into such litigation to protect the interest of the United States.

2. STANDARD FEDERAL EQUAL EMPLOYMENT OPPORTUNITY CONSTRUCTION CONTRACT SPECIFICATIONS (applicable to contracts and subcontracts above $10,000)

A. As used in these specifications:

(1) "Covered area" means the geographical area described in the solicitation from which this contract resulted;

(2) "Director" means Director, Office of Federal Contract Compliance Programs, United States Department of Labor, or any person to whom the Director delegates authority;

(3) "Employer identification number" means the Federal Social Security number used on the Employer's Quarterly Federal Tax Return, U.S. Treasury Department Form 941.

(4) "Minority" includes:

(a) Black (all persons having origins in any of the Black African racial groups not of Hispanic origin);

(b) Hispanic (all persons of Mexican, Puerto Rican, Cuban, Central or South America or other Spanish Culture or origin, regardless of race);

(c) Asian and Pacific Islander (all persons having origins in any of the original people of the Far East, Southeast Asia, the Indian Subcontinent, or the Pacific Islands); and

(d) American Indian or Alaskan Native (all persons having origins in any of the original peoples of North America and maintaining identifiable tribal affiliations through membership and participation or community identification).

B. When the Contractor, or any subcontractor, at anytime, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract, in excess of $10,000, the provisions of these specifications and the Notice which contains the applicable goals for minority and female participation and which is set forth in the solicitations from which this contract resulted.

C. If the Contractor is participating (pursuant to 41 CFR 60-4.5) in a Hometown Plan approved by the U.S. Department of Labor in the covered area either individually or through an association, its affirmative action obligations on all work in the Plan area (including goals and timetables) shall be in accordance with that Plan for those trades which have unions participating in the Plan. Contractors must be able to demonstrate their participation in compliance with the provisions of any such Hometown Plan. Each

Contractor or subcontractor participating in an approved Plan is individually required to comply with its obligations under the EEO clause, and to make a good faith effort to achieve each goal under the Plan in each trade in which it has employees. The overall good faith performance by other Contractors or subcontractors toward a goal in an approved Plan does not excuse any covered Contractor's or subcontractor's failure to take good faith efforts to achieve the Plan goals and timetables.

D. The Contractor shall implement the specific affirmative action standards provided in paragraphs G(1) through G(16) of these specifications. The goals set forth in the solicitation from which this contract resulted are expressed as percentages of the total hours of employment and training of minority and female utilization the Contractor should reasonably be able to achieve in each construction trade in which it has employees in the covered area. Covered construction contractors performing contracts in geographical areas where they do not have a federal or federally-assisted construction contract shall apply the minority and female goals established for the geographic area where the contract is being performed. Goals are published periodically in the Federal Register in notice form and such notices may be obtained from any Office of Federal Contract Compliance Programs office or from Federal procurement contracting officers. The Contractor is expected to make substantially uniform progress in meeting its goals in each craft during the period specified.

E. Neither the provisions of any collective bargaining agreement, nor the failure by a union with whom the Contractor has a collective bargaining agreement, to refer either minorities or women shall excuse the Contractor's obligations under these specifications, Executive Order 11246, or the regulations promulgated pursuant thereto.

F. In order for the non-working training hours of apprentices and trainees to be counted in meeting the goals, such apprentices and trainees must be employed by the Contractor during the training period, and the Contractor must have made a commitment to employ the apprentices and trainees at the completion of their training, subject to the availability of employment opportunities. Trainees must be trained pursuant to training programs approved by the U.S. Department of Labor.

G. The Contractor shall take specific affirmative action to ensure equal employment opportunity. The evaluation of the Contractor's compliance with these specifications shall be based upon its effort to achieve maximum results from its actions. The Contractor shall document these efforts fully, and shall implement affirmative action steps at least as extensive as the following:

    (1) Ensure and maintain a working environment free of harassment, intimidation, and coercion at all sites, and in all facilities at which the Contractor's employees are assigned to work. The Contractor, where possible, will assign two or more women to each construction project. The Contractor shall specifically ensure that all foremen, superintendents and other on-site supervisory personnel are aware of and carry out the Contractor's obligation to maintain such a working environment, with specific attention to minority or female individuals working at such sites or in such facilities.

(2) Establish and maintain a current list of minority and female recruitment sources, provide written notification to minority and female recruitment sources and to community organizations when the Contractor or its unions have employment opportunities available, and maintain a record of the organization's responses.

(3) Maintain a current file of the names, addresses, and telephone numbers of each minority and female off-the-street applicant and minority or female referral from a union, a recruitment source, or community organization and of what action was taken with respect to each such individual. If such individual was sent to the union hiring hall for referral and was not referred back to the Contractor by the union or, if referred, not employed by the Contractor, this shall be documented in the file with the reason therefore, along with whatever additional actions the Contractor may have taken.

(4) Provide immediate written notification to the Director when the union or unions with which the Contractor has a collective bargaining agreement have not referred to the Contractor a minority person or woman sent by the Contractor, or when the Contractor has other information that the union referral process has impeded the Contractor's efforts to meet its obligations.

(5) Develop on-the-job training opportunities and/or participate in training programs for the area which expressly includes minorities and women, including upgrading programs and apprenticeship and trainee programs relevant to the Contractor's employment needs, especially those programs funded or approved by the Department of Labor. The Contractor shall provide notice of these programs to the sources compiled under G(2) above.

(6) Disseminate the Contractor's EEO policy by providing notice of the policy to unions and training programs and requesting their cooperation in assisting the Contractor in meeting its EEO obligations; by including it in any policy manual and collective bargaining agreement; by publicizing it in the company newspaper, annual report, etc.; by specific review of the policy with all management personnel and with all minority and female employees at least once a year; and by posting the company EEO policy on a bulletin board accessible to all employees at each location where construction work is performed.

(7) Review, at least annually, the company's EEO policy and affirmative action obligations under these specifications with all employees having any responsibility for hiring, assignment, layoff, termination, or other employment decisions including specific review of these items with on-site supervisory personnel such as Superintendents, General Foreman, etc., prior to the initiation of construction work at any job site. A written record shall be made and maintained identifying the time and place of these meetings, persons attending, subject matter discussed, and disposition of the subject matter.

(8) Disseminate the Contractor's EEO policy externally by including it in any advertising in the news media, specifically including minority and female news media, and providing written notification to and discussing the Contractor's

EEO policy with other Contractors and Subcontractors with whom the Contractor does or anticipates doing business.

(9) Direct its recruitment efforts, both oral and written, to minority, female and community organizations, to schools with minority and female students and to minority and female recruitment and training organizations serving the Contractor's recruitment area and employment needs. Not later than one month prior to the date for acceptance of applications for apprenticeship or other training by any recruitment source, the Contractor shall send written notification to organizations such as the above, describing the openings, screening procedures, and tests to be used in the selection process.

(10) Encourage present minority and female employees to recruit other minority persons and women and, where reasonable, provide after school, summer, and vacation employment to minority and female youth both on the site and in other areas of a Contractor's work force.

(11) Validate all tests and other selection requirements where there is an obligation to do so under 41 CFR Part 60-3.

(12) Conduct, at least annually, an inventory and evaluation of all minority and female personnel for promotional opportunities and encourage these employees to seek or to prepare for, through appropriate training, etc., such opportunities.

(13) Ensure that seniority practices, job classifications, work assignments and other personnel practices, do not have a discriminatory effect by continually monitoring all personnel and employment related activities to ensure that the EEO policy and the Contractor's obligations under these specifications are being carried out.

(14) Ensure that all facilities and company activities are nonsegregated except that separate or single-user toilet and necessary changing facilities shall be provided to assure privacy between the sexes.

(15) Document and maintain a record of all solicitations of offers for subcontracts from minority and female construction contractors and suppliers, including circulation of solicitation to minority and female contractor associations and other business associations.

(16) Conduct a review, at least annually, of all supervisors' adherence to and performance under the Contractor's EEO policies and affirmative action obligations.

H. Contractors are encouraged to participate in voluntary associations which assist in fulfilling one or more of their affirmative action obligations (G(1) through G(16)). The efforts of a contractor association, joint contractor-union, contractor-community, or other similar group of which the Contractor is a member and participant, may be asserted as fulfilling any one or more of its obligations under G(1) through G(16) of these specifications provided that the Contractor actively participates in the group,

makes every effort to assure that the group has a positive impact on the employment of minorities and women in the industry, ensures that the concrete benefits of the program are reflected in the Contractor's minority and female workforce participation, makes a good faith effort to meet its individual goals and timetables, and can provide access to documentation which demonstrates the effectiveness of actions taken on behalf of the Contractor. The obligation shall not be a defense for the Contractor's non-compliance.

I. A single goal for minorities and a separate single goal for women has been established. The Contractor, however, is required to provide equal employment opportunity and to take affirmative action for all minority groups, both male and female, and all women, both minority and non-minority. Consequently, the Contractor may be in violation of the Executive Order if a particular group is employed in a substantially disparate manner (for example, even though the Contractor has achieved its goals for women generally, the Contractor may be in violation of the Executive Order if a specific minority group of women is underutilized).

J. The Contractor shall not use the goals and timetables or affirmative action standards to discriminate against any persons because of race, color, religion, sex, or national origin.

K. The Contractor shall not enter into any subcontract with any person or firm debarred from government contracts pursuant to E.O. 11246.

L. The Contractor shall carry out such sanctions and penalties for violation of these specifications and of the Equal Opportunity Clause including suspension, termination, and cancellation of existing subcontracts as may be imposed or ordered pursuant to E.O. 11246, as amended.

M. The Contractor, in fulfilling its obligations under these specifications, shall implement specific affirmative action steps, at least as extensive as those standards prescribed in paragraph G of these specifications, so as to achieve maximum results from its efforts to ensure equal employment opportunity. If the Contractor fails to comply with the requirements of the Executive Order, the implementing regulations, or these specifications, the Director shall proceed in accordance with 41 CFR 60-4.8.

N. The Contractor shall designate a responsible official to monitor all employment related activity to ensure that the company EEO policy is being carried out, to submit reports relating to the provisions hereof as may be required by the government and to keep records. Records shall at least include for each employee, the name, address, telephone numbers, construction trade, union affiliation if any, employee identification number where assigned, social security number, race, sex, status (e.g., mechanic, apprenticeship trainee, helper, or laborer), dates of changes in status, hours worked per week in the indicated trade, rate of pay, and location at which the work was performed. Records shall be maintained in an easily understandable and retrievable form; however, to the degree that existing records satisfy this requirement, Contractors shall not be required to maintain separate records.

O. Nothing herein provided shall be construed as a limitation upon the application of other laws which establish different standards of compliance or upon the application or

requirements for the hiring of local or other area residents (e.g., those under the Public Works Employment Act of 1977)

3. CERTIFICATION OF NONSEGREGATED FACILITIES
(applicable to contracts and subcontracts over $10,000)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he/she does not maintain or provide for his/her establishments, and that he/she does not permit employees to perform their services at any location, under his/her control, where segregated facilities are maintained. He/she certifies further that he/she will not maintain or provide for employees any segregated facilities at any of his/her establishments, and he/she will not permit employees to perform their services at any location under his/her control where segregated facilities are maintained. The bidder, offeror, applicant or subcontractor agrees that a breach of this certification is a violation of the equal opportunity clause of this contract.

As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation and housing facilities provided for employees which are segregated by explicit directive or are, in fact, segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason.

He/she further agrees that (except where he/she has obtained for specific time periods) he/she will obtain identical certification from proposed subcontractors prior to the award of subcontracts exceeding $10,000 which are not exempt from the provisions of the equal opportunity clause; that he/she will retain such certifications in his/her files; and that he/she will forward the following notice to such proposed subcontractors (except where proposed subcontractors have submitted identical certifications for specific time periods).

4. CIVIL RIGHTS

The Contractor shall comply with the provisions of Title VI of the Civil Rights Act of 1964. No person shall, on the grounds of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.

5. SECTION 109 OF THE HOUSING AND COMMUNITY DEVELOPMENT ACT OF 1974

The Contractor shall comply with the provisions of Section 109 of the Housing and Community Development Act of 1974. No person in the United States shall on the grounds of race, color, national origin, or sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity funded in whole or in part with funds made available under this title. Section 109 further provides that discrimination on the basis of age under the Age Discrimination Act of 1975 or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973, as amended, is prohibited.

6. SECTION 3 OF THE HOUSING AND URBAN DEVELOPMENT ACT OF 1968 - COMPLIANCE IN THE PROVISION OF TRAINING, EMPLOYMENT AND BUSINESS OPPORTUNITIES

(applicable to all Construction contracts over $200,000 – see HUD website for current requirements - https://www.hud.gov/section3/)

A. The work to be performed under this contract is subject to the requirements of Section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by Section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 75, which implement Section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 5 regulations.

C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this Section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the Section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each, and the name and location of the person(s) taking applications for each of the positions, and the anticipated date the work shall begin.

D. The contractor agrees to include this Section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 75, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this Section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 75. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 75.

E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 75 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 75.

F. Noncompliance with HUD's regulations in 24 CFR part 75 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.

G. With respect to work performed in connection with Section 3 covered Indian housing assistance, Section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of Section 3 and section 7(b) agree to comply with Section 3 to the maximum extent feasible, but not in derogation of compliance with Section 7(b).

8. SECTION 503 OF THE REHABILITATION ACT OF 1973 (29 USC 793)
(applicable to contracts and subcontracts over $10,000)

A. The contractor will not discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant for employment is otherwise qualified. The contractor agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices such as the following: employment upgrading, demotion or transfer, recruitment, advertising, layoff or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

B. The Contractor agrees to comply with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

C. In the event of the Contractor's noncompliance with the requirements of this clause, actions for noncompliance may be taken in accordance with the rules, regulations, and relevant orders of the Secretary of Labor issued pursuant to the Act.

D. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices in a form to be prescribed by the Director, provided by or through the contracting officer. Such notices shall state the Contractor's obligation under the law to take affirmative action to employ and advance in employment qualified handicapped employees and applicants for employment, and the rights of applicants and employees.

E. The Contractor will notify each labor union or representative of workers with which it has a collective bargaining agreement or other contract understanding, that the Contractor is bound by the terms of Section 503 of the Rehabilitation Act of 1973, and is committed to take affirmative action to employ and advance in employment physically and mentally handicapped individuals.

F. The Contractor will include the provisions of this clause in every subcontract or purchase order of $10,000 or more unless exempted by rules, regulations, or orders of the Secretary issued pursuant to Section 503 of the Act, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the Director of the Office of Federal Contract Compliance Programs may direct to enforce such provisions, including action for noncompliance.

9. SECTION 504 OF THE REHABILITATION ACT OF 1973, AS AMENDED

The Contractor agrees that no otherwise qualified individual with disabilities shall, solely by reason of his disability, be denied the benefits, or be subjected to discrimination including discrimination in employment, any program or activity that receives the benefits from the federal financial assistance.

10. AGE DISCRIMINATION ACT OF 1975

The Contractor shall comply with the provisions of the Age Discrimination Act of 1975. No person in the United States shall, on the basis of age, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under, any program or activity receiving federal financial assistance.

11. CERTIFICATION OF COMPLIANCE WITH AIR AND WATER ACTS (applicable to contracts and subcontracts exceeding $150,000)

The Contractor and all subcontractors shall comply with the requirements of the Clean Air Act, as amended, 42 USC 1857 et seq., the Federal Water Pollution Control Act, as amended, 33 USC 1251 et seq., and the regulations of the Environmental Protection Agency with respect thereto, at 40 CFR Part 15, as amended.

In addition to the foregoing requirements, all nonexempt contractors and subcontractors shall furnish to the owner, the following:

A. A stipulation by the Contractor or subcontractors, that any facility to be utilized in the performance of any nonexempt contract or subcontract, is not listed on the List of Violating Facilities issued by the Environmental Protection Agency (EPA) pursuant to 40 CFR Part 15, as amended.

B. Agreement by the Contractor to comply with all the requirements of Section 114 of the Clean Air Act, as amended, (42 USC 1857 c-8) and Section 308 of the Federal Water Pollution Control Act, as amended, (33 USC 1318) relating to inspection, monitoring, entry, reports and information, as well as all other requirements specified in said Section 114 and Section 308, and all regulations and guidelines issued thereunder.

C. A stipulation that as a condition for the award of the contract, prompt notice will be given of any notification received from the Director, Office of Federal Activities, EPA, indicating that a facility utilized, or to be utilized for the contract, is under consideration to be listed on the EPA List of Violating Facilities.

D. Agreement by the Contractor that he will include, or cause to be included, the criteria and requirements in paragraph (1) through (4) of this section in every nonexempt subcontract and requiring that the Contractor will take such action as the government may direct as a means of enforcing such provisions.

12. SPECIAL CONDITIONS PERTAINING TO HAZARDS, SAFETY STANDARDS AND ACCIDENT PREVENTION

A. Lead-Based Paint Hazards

The construction or rehabilitation of residential structures is subject to the HUD Lead-Based Paint regulations, 24 CFR Part 35. The Contractor and subcontractors shall comply with the provisions for the elimination of lead-based paint hazards under Subpart B of said regulations. The Owner will be responsible for the inspections and certifications required under Section 35.14 (f) thereof.

B. Safety Devices

The Contractor shall make all necessary precautions to guard against damages to property and injury to persons. He shall put up and maintain in good condition, warning lights at night, suitable barricades and other devices necessary to protect the public. In case the Contractor fails or neglects to take such precautions, the Owner may have such lights and barricades installed and charge the cost of this work to the Contractor. Such action by the Owner does not relieve the Contractor of any liability incurred under these specifications or contract.

13. FLOOD DISASTER PROTECTION

This contract is subject to the requirements of the Flood Disaster Protection Act of 1973 (P.L. 93-234). Nothing included as a part of this contract is approved for acquisition or construction purposes as defined under Section 3(a) of said Act, for use in an area identified by the Secretary of HUD as having special flood hazards which is located in a community not then in compliance with the requirements for participation in the National Flood Insurance Program pursuant to Section 201(d) of said Act; and the use of any assistance provided under this contract for such acquisition for construction in such identified areas in communities then participating in the National Flood Insurance Program shall be subject to the mandatory purchase of flood insurance requirements or Section 102(a) of said Act.

Any contract or agreement for the sale, lease, or other transfer of land acquired, cleared or improved with assistance provided under this Contract shall contain, if such land is located in an area identified by the Secretary as having special flood hazards and in which the sale of flood insurance has been made available under the National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq., provisions obligating the transferee and its successors or assigns to obtain and maintain, during the ownership of such land, such flood insurance as required with respect to financial assistance for acquisition or construction purposes under Section 102(a) of Flood Disaster Protection Act of 1973.

14. ACCESS TO RECORDS - MAINTENANCE OF RECORDS

The City of Lakewood, CA, the State of California, the Department of Housing and Urban Development, the Comptroller General of the United States, or any of their duly authorized representatives, shall have access to any books, documents, papers and records of the Contractor which are directly pertinent to this specific contract, for the purpose of audits, examinations, and making excerpts and transcriptions. All records connected with this contract will be maintained in a central location by the unit of local government and will be maintained for a period of five (5) years from the official date of the State's final closeout of the grant.

15. INSPECTION

The authorized representative and agents of the State of New Jersey and the Department of Housing and Urban Development shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records.

16. REPORTING REQUIREMENTS

The Contractor shall complete and submit all reports, in such form and according to such schedule, as may be required by the Owner.

17. CONFLICT OF INTEREST

A. No officer or employee of the local jurisdiction or its designees or agents, no member of the governing body, and no other public official of the locality who his/her tenure or for one year thereafter, shall have any interest, direct or indirect, in any contract or subcontract, or the proceeds thereof, for work to be performed. Further, the Contractor shall cause to be incorporated in all subcontracts the language set forth in this paragraph prohibiting conflict of interest.

B. No member of or delegate to Congress, or Resident Commissioner, shall be admitted to any share or part of this contract or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this contract if made with a corporation for its general benefit.

18. ACTIVITIES AND CONTRACTS NOT SUBJECT TO EXECUTIVE ORDER 11246, AS AMENDED (applicable to contracts and subcontracts of $10,000 and under)

During the performance of this contract, the Contractor agrees as follows:

A. The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor shall take affirmative action to ensure that applicants for employment are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to, the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship.

B. The Contractor shall post in conspicuous places, available to employees and applicants for employment, notices to be provided by Contracting Officer setting forth the provisions of this non-discrimination clause. The Contractor shall state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

C. Contractors shall incorporate foregoing requirements in all subcontracts.

19. PATENTS

A. The Contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of any patented or unpatented invention, process, article, or appliance manufactured or used in the performance of the contract including its use by the Owner, unless otherwise specifically stipulated in the Contract Document.

B. License or Royalty Fees: License and/or Royalty Fees for the use of a process which is authorized by the Owner of the project must be reasonable, and paid to the holder of the patent, or his authorized license, direct by the Owner and not by or through the Contractor.

C. If the Contractor uses any design device or materials covered by letters, patent or copyright, he shall provide for such use by suitable agreement with the owner of such patented or copyrighted design device or material. It is mutually agreed and understood, that without exception the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his Sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copy-righted design, device or materials or any trademark or copy-right in connection with work agreed to be performed under this contract, and shall indemnify the Owner for any cost, expense, or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

20. COPYRIGHT

No materials, to include but not limited to reports, maps, or documents produced as a result of this contract, in whole or in part, shall be available to the Contractor for copyright purposes. Any such materials produced as a result of this contract that might be subject to copyright shall be the property of the Owner and all such rights shall belong to the Owner.

21. TERMINATION FOR CAUSE

If, through any cause, the Contractor shall fail to fulfill in a timely and proper manner his obligations under this contract, or if the Contractor shall violate any of the covenants, agreements, or stipulations of this contract, the Owner shall thereupon have the right to terminate this contract by giving written notice to the Contractor of such termination and specifying the effective date thereof, at least five (5) days before the effective date of such termination. In such event, all finished or unfmished documents, data, studies, surveys, drawings, maps, models, photographs, and reports prepared by the Contractor under this contract shall, at the option of the Owner, become the Owner's property and the Contractor shall be entitled to receive just and equitable compensation for any work satisfactorily completed hereunder. Notwithstanding the above, the Contractor shall not be relieved of liability to the Owner for damages sustained by the Owner by virtue of any breach of the contract by the Contractor, and the Owner may withhold any payments to the Contractor for the purpose of set-off until such time as the exact amount of damages due the Owner from the Contractor is determined.

22. TERMINATION FOR CONVENIENCE

The Owner may terminate this contract at any time by giving at least ten (10) days notice in writing to the Contractor. If the contract is terminated by the Owner as provided herein, the Contractor will be paid for the time provided and expenses incurred up to the termination date.

23. ENERGY EFFICIENCY

The Contractor shall comply with mandatory standards and policies relating to energy efficiency which are contained in the state energy conservation plan issued in compliance with the Energy Policy and Conservation Act (Public Law 94-163).

24. SUBCONTRACTS

A. The Contractor shall not enter into any subcontract with any subcontractor who has been debarred, suspended, declared ineligible, or voluntarily excluded from participating in contacting programs by any agency of the United States Government or the State of New Jersey.

B. The Contractor shall be as fully responsible to the Owner for the acts and omissions of the Contractor's subcontractors, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by the Contractor.

C. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractor to the Contractor by the terms of the contract documents insofar as applicable to the work of subcontractors and to give the Contractor the same power as regards terminating any subcontract that the Owner may exercise over the Contractor under any provision of the contract documents.

D. Nothing contained in this contract shall create any contractual relation between any subcontractor and the Owner.

25. DEBARMENT, SUSPENSION, AND INELIGIBILITY

The Contractor represents and warrants that it and its subcontractors are not debarred, suspended, or placed in ineligibility status under the provisions of 24 CFR 24 (government debarment and suspension regulations).

26. PROTECTION OF LIVES AND HEALTH

The Contractor shall exercise proper precaution at all times for the protection of persons and property and shall be responsible for all damages to persons or property, either on or off the worksite, which occur as a result of his prosecution of the work. The safety provisions of applicable laws and building and construction codes, in addition to specific safety and health regulations described by Chapter XIII, Bureau of Labor Standards, Department of Labor, Part 1518, Safety and Health Regulations for Construction, as outlined in the Federal Register, Volume 36, No. 75, Saturday, April 17, 1971, Title 29 - LABOR, shall be observed and the Contractor shall take or cause to be taken, such

additional safety and health measures as the Owner may determine to be reasonably necessary.

27. BREACH OF CONTRACT TERMS

Any violation or breach of terms of this contract on the part of the Contractor or the Contractor's subcontractors may result in the suspension or termination of this contract or such other action that may be necessary to enforce the rights of the parties of this contract. The duties and obligations imposed by the contract documents and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

28. PROVISIONS REQUIRED BY LAW DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either party the contract shall forthwith be physically amended to make such insertion or correction.

29. CHANGES

The Owner may, from time to time, request changes in the scope of the services of the Contractor to be performed hereunder. Such changes, including any increase or decrease in the amount of the Contractor's compensation which are mutually agreed upon by and between the Owner and the Contractor, shall be incorporated in written and executed amendments to this Contract.

30. PERSONNEL

The Contractor represents that it has, or will secure at its own expense, all personnel required in performing the services under this Contract. Such personnel shall not be employees of or have any contractual relationship with the Owner.

All the services required hereunder will be performed by the Contractor or under its supervision, and all personnel engaged in the work shall be fully qualified and shall be authorized or permitted under State and local law to perform such services.

No person who is serving sentence in a penal or correctional institution shall be employed on work under this Contract.

31. ANTI-KICKBACK RULES

Salaries of personnel performing work under this Contract shall be paid unconditionally and not less often than once a month without payroll deduction or rebate on any account except only such payroll deductions as are mandatory by law or permitted by the applicable regulations issued by the Secretary of Labor pursuant to the "Anti-Kickback Act" of June 13, 1934 (48 Stat. 948; 62 Stat. 740; 63 Stat. 108; Title 18 U.S.C. 874; and Title 40 U.S.C. 276c). The Contractor shall comply with all applicable "Anti-Kickback" regulations and shall insert appropriate provisions in all subcontracts covering work under

this contract to insure compliance by the subcontractors with such regulations, and shall be responsible for the submission of affidavits required of subcontractors thereunder except as the Secretary of Labor may specifically provide for variations of or exemptions from the requirements thereof.

32. ASSIGNABILITY

The Contractor shall not assign any interest in this Contract, and shall not transfer any interest in the same (whether by assignment or novation) without prior written approval of the Owner provided that claims for money due or to become due the Contractor from the Owner under this Contract may be assigned to a bank, trust company, or other fmancial institution, or to a Trustee in Bankruptcy, without such approval. Notice of any such assignment or transfer shall be furnished promptly to the Owner.

33. INTEREST OF CONTRACTOR

The Contractor covenants that he presently has no interest and shall not acquire any interest direct or indirect in the above described project or any parcels therein or any other interest which would conflict in any manner or degree with the performance of his services hereunder. The Contractor further covenants that in the performance of this Contract no person having any such interest shall be employed.

34. POLITICAL ACTIVITY

The Contractor will comply with the provisions of the Hatch Act (5 U.S.C. 1501 et seq.), which limits the political activity of employees.

35. COMPLIANCE WITH THE OFFICE OF MANAGEMENT AND BUDGET

The parties agree to comply with the regulations, policies, guidelines, and requirements of the Office of Management and Budget, Circulars A-95, A-102, A-133, and A-54, as they relate to the use of Federal funds under this contract.

36. DISCRIMINATION DUE TO BELIEFS

No person with responsibilities in operation of the project to which this grant relates will discriminate with respect to any program participant or any applicant for participation in such program because of political affiliation or beliefs.

37. CONFIDENTIAL FINDINGS

All of the reports, information, data, etc., prepared or assembled by the Contractor under this Contract are confidential, and the Contractor agrees that they shall not be made available to any individual or organization without prior written approval of the Owner.

38. LOBBYING

The Contractor certifies, to the best of his or her knowledge and belief that:

1. No federally appropriated funds have been paid or will be paid, by or on behalf of the contractor, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

2. If any funds other than federally appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the contractor shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

39. FEDERAL LABOR STANDARDS PROVISIONS

(applicable to all Construction contracts over $2,000 – see HUD website for current requirements - https://www.hud.gov/program_offices/davis_bacon_and_labor_standards)

The Contractor shall abide by the requirements of the Federal Labor Standards Provisions (HUD-4010).

EXHIBIT B
Minimum Federal Wage Rate Determination

[INSERT Davis-Bacon Wage Rates collected and published as an addendum 10-days before bid opening]

CITY OF LAKEWOOD

FAITHFUL PERFORMANCE BOND

PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

KNOW ALL MEN BY THESE PRESENTS:

That we, _____
as principal, and _____
as surety, are held and firmly bound unto the CITY OF LAKEWOOD, State of California, in the sum of _____
Dollars ($_____), lawful money of the United States, for the payment of which sum, well and truly to be made, we bind ourselves, jointly and severally, firmly by these presents.

The condition of the foregoing obligation is such that whereas said principal has been awarded and is about to enter into the annexed contract with the City of Lakewood, State of California, for:

PALMS PARK COMMUNITY CENTER IMPROVEMENTS, PROJECT NO. PW23-01

and as required by said City to give this bond in connection with the execution of said contract;

NOW, THEREFORE, if the said principal shall well and truly do and perform all of the covenants and obligations of said contract on (circle one) his/her/their part to be done, performed at the times, in the manner specified therein, and within the time limit prescribed as well as in a manner that is satisfactory and acceptable to the City and if all materials and workmanship supplied by said principal are free from original or developed defects and failures and make all replacements and adjustments required, within a reasonable time after being notified by the City so to do, then this obligation shall be null and void, otherwise it shall be and remain in full force and effect.

This bond shall be maintained by the contractor in full force and effect during the performance of the work of the contractor and for a period of one year after the date of acceptance of the work by the City.

No premature payment by said City to said principal shall exonerate any surety unless the City Council of said City shall have actual notice that such payment is premature at the time it is ordered by said City Council, and then only to the extent that such payment shall result in loss to said surety, but in no event more than the amount of such premature payment.

The said surety for value received hereby stipulates and agrees that no amendment, change, extension of time, alteration or addition to said contract or agreement, or of any feature or item, or items of performance required therein or thereunder, shall in any manner affect its obligation on or under this bond; and said surety does hereby waive notice of said amendment, change, extension of time, alteration or addition to said contract or agreement and of any feature of item or items of performance required therein or hereunder.

(Where principal is individual or partnership) the said surety for value received hereby stipulates and agrees that the death of the principal or principals shall not relieve the surety of its obligation.

WITNESS our hands this _____day of _____, 20 ____.

Principal's Signature: _____

Surety: _____

Address: _____

Telephone: _____

STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

On this _____ day of _____, 20 _____, before me _____, (here insert name and title of the officer), personally appeared _____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and Official Seal:

_____
Notary Public in and for said County and State

CITY OF LAKEWOOD

PAYMENT BOND

PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

KNOW ALL MEN BY THESE PRESENTS:

That we, as Principal and Surety(ies) hereto, are firmly bound to the CITY OF LAKEWOOD, CALIFORNIA, and to all persons, companies or corporations who are claimant under Title 15 of the Civil Code of the State of California, commencing with Section 3082, under and by virtue of the above mentioned Public Works contract of the City of Lakewood in the sum of _____Dollars ($_____), lawful money of the United States and we bind ourselves jointly and severally for the payment of said sum as follows:

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal entered into the contract identified above;

NOW, THEREFORE, if the Principal shall promptly make payment to all persons supplying labor and materials in the prosecution of the work provided for in said contract, and any and all duly authorized modification of said contract that may hereafter be made, notice of which modification to the Surety(ies) is being hereby waived, then the above obligation shall be void and of no effect. Otherwise, if the original contractor or his subcontractor fails to pay any of the persons named in Section 3181 of the Civil Code of the State of California, or amounts due under the Unemployment Insurance Code with respect to work or labor performed by any said claimant, or for any amount required to be deducted, withheld, and paid over to the Franchise Tax Board from the wages of the employees of the contractor and his subcontractor pursuant to Section 188806 of the Revenue and Taxation Code, with respect to such work and labor, that the Surety or Sureties will pay for the same in an amount not exceeding the sum specified in the Bond.

PROVIDED that this Bond is filed by the Principal to comply with the provisions of Title 15 (Work of Improvement) of the Civil Code of the State of California commencing with Section 3082 and is for the benefit of any of the persons named in Section 3181 so as to give a right of action to such persons or their assigns in any suit brought upon the Bond.

IN WITNESS WHEREOF, We, the Principal and Surety(ies), bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, as above set forth this _____day of _____20 ___.

PRINCIPAL:
Name of Principal: _____

Signature of Principal or Authorized Agent: _____

CORPORATE SURETY:	**INDIVIDUAL SURETIES:**	
Name of Corporate Surety	First Individual Surety	Second Individual Surety
State of Incorporation	Name	Name
Signature of Agent	Signature	Signature
Address	Address	Address

STATE OF CALIFORNIA)
) ss.
COUNTY OF LOS ANGELES)

On this _____ day of _____, 20 _____, before me _____, (here insert name and title of the officer), personally appeared _____, personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

Witness my hand and Official Seal:

_____
Notary Public in and for said County and State

NOTE: To be approved the bond must be executed by two or more good and sufficient sureties or corporate surety and in the same amount as the contract bid amount

CITY OF LAKEWOOD

COMPENSATION INSURANCE CERTIFICATE

Pursuant to Section 1861 of the State Labor Code, each contractor to whom a public works contract has been awarded shall sign the following certificate and shall submit same to the City prior to performing any work on the contract:

"*I am aware of the provisions of Section 3700 of the Labor Code which requires every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code, and I will comply with such provisions before commencing the performance of work of this contract*."

_____
Contractor

By_____
(PRINT)

_____
(SIGNATURE)

_____
Title

_____
Date

Section 3700 of the Labor Code reads as follows:

"Every employer except the State shall secure the payment of compensation in one or more of the following ways:

"(a) By being insured against liability to pay compensation in one or more insurers duly authorized to write compensation insurance in this state.

(b) By securing from the Director of Industrial Relations a certificate of consent to self-insure, which may be given upon furnishing proof satisfactory to the Director of Industrial Relations of ability to self-insure and to pay any compensation that may become due to his employee."

COMPENSATION INSURANCE CERTIFICATE

TO BE SUBMITTED WITH CONTRACT

[Not a required document - optional]

CITY OF LAKEWOOD
ESCROW AGREEMENT FOR SECURITY DEPOSITS IN LIEU OF CASH

PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

This escrow Agreement is made and entered into by and between the City of Lakewood, a Municipal Corporation, whose address is 5050 Clark Avenue, Lakewood, California, sometimes hereinafter called "Owner", and_____
hereinafter called "Contractor", whose address is _____
and _____hereinafter called "Escrow Agent", whose address is_____.

For the consideration hereinafter set forth, the Owner, Contractor and Escrow Agent agree as follows:

(1) Pursuant to Section 22300 of the Public Contract Code of the State of California, Contractor has the option to deposit securities with Escrow Agent as a substitute for retention earnings required to be withheld by Owner pursuant to the Construction Contract entered into between the Owner and Contractor for PALMS PARK COMMUNITY CENTER IMPROVEMENTS, PROJECT NO. PW23-01 in the amount of $_____dated (hereinafter referred to as the "Contract"). When Contractor deposits the securities as a substitute for Contract earnings, the Escrow Agent shall notify the Owner within ten (10) days of the deposit. The market value of the securities at the time of the substitution shall be at least equal to the cash amount then required to be withheld as retention under the terms of the Contract between the Owner and Contractor. Securities shall be held in the name of _____, and shall designate the Contractor as the beneficial owner.

(2) The Owner shall make progress payments to the Contractor for such funds which otherwise would be withheld from progress payments pursuant to the Contract provisions, provided that the Escrow Agent holds securities in the form and amount specified above.

(3) Alternatively, on written request of the Contractor, Owner shall make payments of the retention earnings directly to the Escrow Agent. When the Owner makes payment of retentions earned directly to the Escrow Agent, the escrow Agent shall hold them for the benefit of the Contractor until the time that the escrow created under this contract is terminated. The Contractor may direct the investment of the payments into securities. All terms and conditions of this agreement and the rights and responsibilities of the parties shall be equally applicable and binding when the Owner pays the Escrow Agent directly.

(4) Contractor shall be responsible for paying all fees for the expenses incurred by Escrow Agent in administering the Escrow Account and all expenses of the Owner. These expenses and payment terms shall be determined by the Owner, Contractor, and Escrow Agent.

(5) The interest earned on the securities or the money market accounts held in escrow and all interest earned on that interest shall be for the sole account of Contractor and shall be subject to withdrawal by contractor at any time and from time to time without notice to the Owner.

(6) Contractor shall have the right to withdraw all or any part of the principal in the Escrow Account only by written notice to Escrow Agent accompanied by written authorization from Owner to the Escrow Agent that Owner consents to the withdrawal of the amount sought to be withdrawn by Contractor.

(7) The Owner shall have the right to draw upon the securities in the event of default by the Contractor. Upon seven (7) days written notice to the Escrow Agent from the owner of the default, the escrow agent shall immediately convert the securities to cash and shall distribute the cash as instructed by the Owner.

(8) Upon receipt of written notification from the Owner, certifying that the Contract is final and complete, and that the Contractor has complied with all requirements and procedures applicable to the Contract, Escrow Agent shall release to Contractor all securities and interest on deposit less escrow fees and charges of the Escrow Account. The escrow shall be closed immediately upon disbursement of all moneys and securities on deposit and payments of fees and charges.

(9) Escrow Agent shall rely on the written notifications from the Owner and the Contractor pursuant to Sections (5) to (8), inclusive, of this agreement and the Owner and Contractor shall hold Escrow Agent harmless from Escrow Agent's release and disbursement of the securities and interest as set forth above.

(10) The names of the persons who are authorized:

On behalf of the City: On behalf of the Contractor:

Title _____ Title_____

Name _____ Name_____

Signature _____ Signature_____

Address _____ Address_____

Telephone _____ Telephone_____

On behalf of the Escrow Agent:

Title_____

Name_____

Signature_____

Address_____

Telephone_____

At the time the Escrow Account is opened, the Owner and Contractor shall deliver to the Escrow Agent a fully executed counterpart of this Agreement.

IN WITNESS WHEREOF, the parties have executed this Agreement by their proper officers on the date set forth below:

CITY OF LAKEWOOD: A Municipal Corporation	CONTRACTOR:	ESCROW AGENT:
_____	_____	_____
MAYOR	NAME	NAME
_____	_____	_____
SIGNATURE	TITLE	TITLE
ATTEST:		
_____	_____	_____
CITY CLERK	SIGNATURE	SIGNATURE

CITY OF LAKEWOOD

GENERAL PROVISIONS
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

SPECIFICATIONS

This Project shall be governed by the Contract Documents consisting of the City of Lakewood Public Works Contract (Agreement), Bid Proposal, Plans, Specifications, General Provisions, Special Provisions, Technical Provisions and other documents described herein. The Specifications for this Project are based upon the 2024 Edition of the Standard Specifications for Public Works Construction, also known as the "Greenbook", as amended by the Contract Documents. If there is a conflict between the Agreement and these Specifications, the Agreement shall prevail as solely determined by City.

The Greenbook, including all supplements, is written and promulgated by the Joint Cooperative Committee of the Southern California Chapter of the American Public Works Association and the Southern California District of the Associated General Contractors of California, which is incorporated herein by this reference. Copies of these Standard Specifications are available from the publisher:

BNI Building News
Division of BNi Publications, Inc.
https://www.bnibooks.com
(888) 264-2665

The Standard Specifications set forth above will control the general provisions for this Contract except as amended by the Plans, General Specifications, Special Provisions, Technical Provisions, Public Works Contract (Agreement) or other Contract Documents.

The section numbers of the following Special Provisions coincide with those of the said Standard Specifications. Only those sections requiring amendment, elaboration, addition, or that are specifying options are stated in the Special Provisions. In case of conflict between the Standard Specifications and the General Specifications or Special Provisions, the General Specifications and Special Provisions shall take precedence over and be used in lieu of such conflicting portions of the Standard Specifications.

References in the Special Provisions to "CALTRANS Standard Specifications" shall mean the latest edition of the Standard Specifications of the State of California, Department of Transportation. Copies of these specifications and standard drawings may be obtained from:

California Department of Transportation
Publications Distribution Unit
https://dot.ca.gov/programs/procurement-and-contracts/publications

References in the Special Provisions to Standard Plans shall mean the Standard Plans for Public Works Construction, latest edition (written and promulgated by the Public Works Standards, Inc.), and, where applicable and as determined and selected by the City Engineer, those specific

standard plans of the City of LAKEWOOD, the County of Los Angeles and/or the State Department of Transportation, latest editions.

Where the Plans or Specifications describe portions of the work in general terms, but not in complete detail, it is understood that the item is to be furnished and installed complete and in place and that only the best general practice is to prevail and that only materials and workmanship of the first quality are to be used. Unless otherwise specified, the Contractor shall furnish all labor, materials, tools, equipment and incidentals, and do all the work involved in executing the contract.

SCOPE OF WORK

The work to be performed and completed by Contractor consists of a comprehensive renovation to enhance both the exterior and interior of the Palms Park Community Center. The project scope includes the addition of a new ADA Compatible restroom, removal of existing outdoor patio area and replacement with additional indoor space, path of travel improvements, storefront and other exterior siding improvements, flooring and ceiling renovation, asbestos abatement, roof replacement, HVAC system replacement, new fire sprinkler system, electrical improvements, lighting upgrades, renovation of office, storage and assembly room spaces, park hardscape and parking lot improvements and interior/exterior signage upgrades.

LOCATION OF WORK

The Project is located at Palms Park Community Center, 12305 207th St, Lakewood, CA 90715, as shown on the plans.

TIME OF COMPLETION

The Contractor shall begin work within 15 calendar days after the issuance of the Notice to Proceed. The Contractor shall complete all work in every detail within 110 Working Days after the date of the Notice to Proceed.

RESOLUTION OF CONSTRUCTION CLAIMS

California Public Contract Code (PCC) Section 9204 prescribes a process to present, confer, and mediate all construction claims relating to the City's public works project.

"Public works project" means the erection, construction, alteration, repair, or improvement of any public structure, building, road, or another public improvement of any kind.

"Claim" means a separate demand by the Contractor sent by registered mail or certified mail with return receipt requested for (A) a time extension, including, without limitation for relief from damages or penalties for delay assessed by a public entity under a contract for a public works project (B) payment of money or damages arising from work done by or on behalf of the Contractor pursuant to the contract for a public works project and payment for which is not otherwise expressly provided or to which the claimant is not otherwise entitled, or the amount the payment of which is disputed by the local agency. (PCC 9204(c)(1))

For any claim subject to this article, PCC section 9204 requires the following:

a) The claim shall be submitted by the Contractor in writing, sent by registered mail or certified mail with return receipt requested and must include the documents necessary to substantiate

the claim. Nothing in this subdivision is intended to extend the time limit or supersede notice requirements otherwise provided by contract for the filing of claims. However, upon receipt of a claim, the City, and the Contractor may, by mutual agreement, extend the time period provided by statute.

b) For claims of all amounts, the City shall respond within 45 days of receipt of the claim, and provide the claimant a written statement identifying which portion of the claim is disputed and which portion of the claim is undisputed. If the City requires approval from the City Council, and the City Council does not meet within the 45-day period to respond, the City shall have up to three days to issue its response following the City Council meeting.

c) For all portions of a claim determined to be undisputed, the City must process payment to the claimant within 60 days of issuing the City's written determination.

d) If the claimant disputes the City's response, or if the City fails to respond within the time limits provided, the claimant may demand an informal conference to meet and confer for settlement of the issues in dispute. The demand must be sent in writing by registered or certified mail, return receipt requested. Upon receipt of a demand, the City must schedule a meet and confer conference within 30 days for settlement of the disputed claim.

e) Within 10 business days following the conclusion of the meet and confer conference, if any portion of the claim remains in dispute, the City shall provide the claimant an addition written statement identifying the portion of the claim that is undisputed and the portion that remains in dispute.

f) For all portions of a claim determined to be undisputed, the City must process payment to the claimant within 60 days of issuing the City's written determination.

g) Any remaining undisputed portion of the claim, as identified by the Contractor in writing, shall be submitted to nonbinding mediation in which the parties share the cost evenly. The City and the claimant shall mutually agree on a mediator within 10 business days after the disputed portion of the claim has been identified in writing. If the parties cannot agree, each party shall select a mediator and those mediators shall jointly select a qualified, neutral third party to mediate the remaining undisputed claim. Each party shall bear the respective costs charged by its respective mediator in connection with the selection of the neutral mediator. If mediation is unsuccessful, the parts of the claim remaining in dispute shall be subject to applicable procedures outside of PCC section 9204.

Unless otherwise agreed to by the City and the Contractor in writing, the mediation conducted pursuant to this section shall excuse any further obligation under PCC Section 20104.4 to mediate after litigation has been commenced.

PCC Section 9204 does not preclude the City from requiring arbitration of disputes under private arbitration or the Public Works Contract Arbitration Program if mediation under this section does not resolve the parties' dispute.

Should the City fail to respond to a claim, or fail to issue written statements as required, the Contractor's claim is deemed denied. A claim denied by reason of the City's failure to respond shall not constitute an adverse finding with regard to the merits of the claim or the responsibility or qualifications of the claimant.

Amounts not paid in a timely manner as required by PCC 9204 shall bear interest at seven percent per annum.

NOTICE OF THIRD-PARTY CLAIMS

In accordance with PCC Section 9201, the City will provide timely notification to Contractor of the receipt of any third-party claim relating to the Agreement. The Contractor agrees to reimburse the City for its reasonable costs incurred in providing such notice.

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CITY OF LAKEWOOD

SPECIAL PROVISIONS
FOR
PALMS PARK COMMUNITY CENTER IMPROVEMENTS
PROJECT NO. PW23-01

PART 1 - GENERAL PROVISIONS

SECTION 1 - TERMS, DEFINITIONS, ABBREVIATIONS AND SYMBOLS.

1-2 DEFINITIONS. (Add the following)

City	- **City of LAKEWOOD**
Board	- City Council
Caltrans	- California Department of Transportation
Contract Agreement	- Public Works Contract
County	- County of Los Angeles
Engineer	- City Engineer
Federal	- United States of America
State	- State of California
Contractor	- Contractor, its workers, employees and agents
Project	- Palms Park Community Center Improvements, Project No. PW23-01

1-3 ABBREVIATIONS.

1-3.2 Common Usage. [Add the following to this section]:

MUTCD	- Manual of Uniform Traffic Control Devices, including the California Supplement
LADPW	- Los Angeles Public Works Department
SPPWC	- Standard Plans for Public Works Construction
SSPWC	- Standard Specifications for Public Works Construction
FHWA	- Federal Highway Administration
HUD	- Housing and Urban Development Department

1-7 AWARD AND EXECUTION OF CONTRACT.

1-7.1 General [Add the following]:
If the Agency awards the contract, the award is made to the lowest responsible and responsive bidder.

Within three (3) days of bid opening, the apparent low bid contractor must submit:

- If a bid bond is submitted with a “10% of Bid Value” designation for the amount as noted in the City Approved Bid Bond form, a revised Bid Bond with numerical dollar values, both in words and with digits, shall be submitted to the City.

Within ten (10) days after the date of the formal Notice of Apparent Low Bidder, the Contractor shall execute and return the following documents to the City:

- Two (2) Original Signed Public Works Contracts
- All Insurance Requirements set forth herein
- Faithful Performance Bond
- Payment (Material and Labor) Bond
- Construction Schedule
- Water Pollution Control Plan
- Form W-9
- Encroachment Permit Application
- Construction Materials Submittals
- Traffic Control Plans

FAILURE TO COMPLY WITH ALL OF THE ABOVE CAN RESULT IN ANNULMENT OF THE AWARD AND FORFEITURE OF THE PROPOSAL GUARANTEE AT THE SOLE DISCRETION OF CITY.

The Contract Agreement shall not be considered binding upon the City until executed by the authorized City officials. A corporation to which an award is made may be required, before the Contract Agreement is executed by the City, to furnish evidence of its corporate existence, of its right to enter into contracts in the State of California, and that the officers signing the Contract and bonds for the corporation have the authority to do so.

1-7.2 Contract Bonds. [Replace section with the following]:

Both the Faithful Performance Bond and the Payment (Material and Labor) Bond shall each be for not less than one hundred percent (100%) of the total Contract amount. The Material and Labor Bond shall remain in force until thirty-five (35) days after the date of recordation of the Notice of Completion. The Faithful Performance Bond will be held until its expiration by operation of law from the date of recordation of the Notice of Completion. All bond forms shall meet the requirements of and be subject to approval by the City Attorney.

Prior to the acceptance of any bond, the City shall verify that the surety is an admitted surety in the State of California. If requested by the City, the Contractor shall provide other information specified in the Code of Civil Procedure Section 995.660 to enable the City to verify the sufficiency of the bond.

Should any bond become insufficient, the Contractor shall correct the insufficiency within ten (10) calendar days after receiving notice from the City. The Contractor shall provide the City with evidence of the correction within ten (10) calendar days of said correction. Should any surety at any time be unsatisfactory to the City, written notice will be given to the Contractor to that effect. No further payments shall be deemed due or will be payable under the Contract until Contractor submits an acceptable bond from a surety accepted by the City. Changes to the work or extensions of time made pursuant to the Contract Agreement shall in no way release the Contractor or the surety from its obligations. Notice of such changes or extensions shall be waived by the surety.

The Contractor shall pay all bond premiums, costs, and incidentals.

SECTION 2 – SCOPE OF THE WORK.

2-1 WORK TO BE DONE

2-1.1 Plans and Specifications [Add the following Subsection]:

The Contractor shall maintain a control set of Plans and Specifications on the Project site at all times. All final locations determined in the field, and any deviations from the Plans and Specifications, shall be marked in red on this control set to show the as-constructed conditions. Upon completion of all work, the Contractor shall return the control set to the Engineer. Final payment will not be made until this requirement has been met.

2-2 PERMITS. [Replace section with the following]:
Prior to the start of any work, the Contractor shall take out the applicable City and State permits and make arrangements for City and State inspections. Requests for inspections shall be made to the City at least 24 hours in advance of need. The Contractor and all subcontractors shall each obtain any and all other permits, licenses, inspections, certificates, or authorizations required by any governing body or public utility. Payment for this work shall be included in the bid items of work and no additional compensation will be allowed. The City will waive the usual City encroachment permit fees.

Further, Contractor shall ensure that its employees, agents, contractors, and subcontractors conduct themselves in compliance with such laws and licensure requirements including, without limitation, compliance with laws applicable to nondiscrimination, sexual harassment, and ethical behavior throughout the duration of the Contract. Contractor shall not retain or employ an unlicensed subcontractor to perform work pursuant to this Contract. Contractor shall notify the City immediately and in writing of its employees', agents', contractors' or subcontractors' inability to obtain or maintain, irrespective of the pendency of any appeal, any such licenses, permits, approvals, certificate, waivers, and exemptions that may be required. Such inability shall be cause for termination of this Contract

2-2.1 City Business License. [Add the following Subsection]:
The successful contractor and any subcontractor thereof will be required to comply with the City Business Licensing provisions. No free or exempt license will be issued by the City.

2-3 RIGHT-OF-WAY. [Add the following]:
The City will acquire all rights of way, easements and rights of entry as required for this Project. The Contractor shall verify that the acquisition(s) is/are completed prior to beginning any work outside of the public right of way. All cost for re-mobilization, downtime, etc. due to delays in obtaining the required rights of way, easements and rights of entry shall be included in all other items of work and no additional compensation will be allowed. In the event the required easements have not yet been acquired by the City, the Contractor shall conduct its operation so as to confine its work to the limits of the existing right-of-way.

2-10 DISPUTED WORK. [Add the following]:
In any case where the Contractor believes extra compensation is due the Contractor for work or materials not clearly covered in the Contract, or not ordered by the City as "extra work", the Contractor shall notify the City in writing of the Contractor's intention to make claim for such extra compensation before the Contractor begins the work on which Contractor bases the claim. If such notification is not given, or the City is not afforded proper supporting documentation by the Contractor for keeping strict account of actual cost, then the Contractor shall be deemed to have waived the claims for such extra compensation. Such notice by the Contractor, and the fact that the City has kept account of the cost as aforesaid, shall not in any way be construed as proving the validity of the claim. The validity of the claim must be determined by the City. If the City determines that the claim is well founded, it shall be allowed and paid for as "extra work"; if the City determines that the claim is not well founded, it shall be disallowed and not paid.

SECTION 3 – CONTROL OF THE WORK

3-12.1 General [Add the following]:
The Contractor shall behave, at all times, in a courteous, professional manner. While on site, or entering or exiting the site, there shall be no extraneous activity that might cause disruption to the Project site, surrounding areas, or residents. Failure to comply may result in the suspension of work or removal of contractor's staff from the Project or both without compensation.

3-10 SURVEYING

3-10.1 General. [Replace with the following]:
The Contractor will provide all surveying and all construction staking, if required for the construction of this Project. All surveying Work must conform to the Professional Land Surveyors' Act (Business and Professions Code Section 8700 et seq). All Project surveying notes and "cut-sheets" are to be provided to the City after the completion of each surveying activity and all final surveying notes shall be provided before final payment to the Contractor.

Construction stakes shall be set and stationed by Contractor at its expense. Surveying costs shall be included in the price of items bid. No separate payment will be made. Re-staking and replacement of construction survey markers damaged as a result of the Work, vandalism, or accident shall be at the Contractor's expense.

The Contractor shall be responsible for the finished work's conforming to the lines, grades and benchmarks given by the Engineer. The Contractor shall establish supplementary benchmarks, elevations, lines and grades and any other necessary controls which are not established by the Engineer and which are necessary to complete the work. Compensation for all survey work shall be included within the various items of work and no additional compensation will be allowed.

3-12 WORK SITE MAINTENANCE.

3-12.1 General. [Replace the second paragraph with the following paragraphs]:
The contractor shall, at all times, provide a street legal and licensed self-loading motorized street sweeper equipped with a functional water spray system. The sweeper shall clean all paved areas within the Work site and all paved haul routes at least once each working day and as needed. The Contractor shall keep adjacent properties clean and free of rubbish and debris in a timely manner as necessary and/or as directed by the Engineer. The Contractor shall implement effective handling, storage, usage, and disposal practices to control material pollution and manage waste and nonstormwater at the job site before they come in contact with storm drain systems and receiving waters.

The Contractor shall:

(a) Initiate and maintain a daily program to prevent accumulation of debris on-site and along access roads and haul routes. Maintain areas under Contractor's control free of waste materials, debris, weeds 6" high, and rubbish. Maintain site in a clean and orderly condition.
(b) Provide suitable covered containers for deposit of debris and rubbish. Dispose of accumulation of extraneous materials, prohibit overloading of trucks to prevent spillages on access and haul routes and provide daily inspection of haul routes to enforce requirements.
(c) The Contractor shall supply self-loading motorized street sweepers equipped with a functional water spray system as part of his daily program.
(d) Schedule at a minimum, weekly collection and disposal of debris. Provide additional collections and disposals of debris whenever the weekly schedule is inadequate to prevent

accumulation.

The Contractor shall remove debris from closed or remote spaces prior to closing the space, control cleaning operations to minimize dust and other particulates and immediately remove clay and earth which adhere to the paved surface of the roadway. Remove by hand scraping, washing, sweeping, and/or other method(s) which will leave a clean non-skid surface without impairing, injuring or loosening the surface.

The Contractor is required to control dust throughout the life of the Contract. The control may be required by job conditions or as directed by the City Engineer. In any case, the Contractor shall use water or other means to control the dust. No chemical agents may be used without written authorization from the Agency. The Contractor shall be solely responsible for safety problems, accidents or any other complications or claims arising from inadequate dust control.

The contractor shall make his own arrangements for disposal of materials outside the City premises or right-of-way, and he shall pay all costs involved. EDCO Disposal Services, Inc. has the exclusive right of collection of refuse and construction materials & demolition debris (C & D) in the City of Lakewood and may be reached at (562) 531-3054. The only exception is if the Contractor can provide evidence that the C & D containers to be utilized on this project are owned by the General Contractor. The Contractor shall comply with the City's Waste Management Planning for "C & D Projects" document as directed on the City website: Construction and Demolition Debris Lakewood Online (lakewoodcity.org) Complete and submit Construction Waste Management Plan to the to the City of Lakewood prior to beginning construction and provide a report of debris removal and recycling upon completion of the work.

No separate payment will be made for any work performed or material used to control dust resulting from the Contractor's performance of the work, or by public traffic, either inside or outside the right-of-way. Full compensation for such dust control will be considered as included in the price paid for the various items of work involved. No separate payment will be made for any work performed or material used in cleaning the Project, for filing the Construction Waste Management Plan or reporting the Debris Removal and Recycling Report. Full compensation for such cleaning and reporting shall be considered as included in the price paid for the various items of work involved and no additional compensation will be allowed therefore.

3-12.3 Noise [Replace with the following]
A noise level limit of 86 dbA at a distance of fifty feet (50') shall apply to all construction equipment on or related to the job whether owned by the Contractor or not. The use of excessively loud warning signals shall be avoided except in those cases required for the protection of personnel.

3-12.4.2 Storage in Public Streets. [Replace entire section with the following]:
The Contractor is required to, at his own expense, maintain and operate a work and storage area outside of the public right-of-way. In such case the Contractor shall submit to City written authorization from the owners of the subject property prior to occupation. Occupation of site without written authorization shall be grounds for immediate suspension of work. Location of site to be approved by City. Condition and operation of yard shall conform to these specifications. The Contractor shall assume full responsibility for all damage to the site resulting from his operations and shall repair and/or replace same, at his own expense, to the satisfaction of the owner of the subject property. The Contractor shall vacate site and return it to pre-Project condition within five (5) working days following application for Notice of Completion. The Contractor shall obtain a written release from the property owner accepting the condition of the vacated site and releasing

the Contractor from any further clean-up or restoration work and shall submit a copy of such release to City. The Notice of Completion will not be issued until said release is submitted.

3-12.6.2 Best Management Practices (BMPs). [Add the following]:
Per the Federal Clean Water Act, the California Construction Stormwater General Permit Order 2022-0057-DWQ and the Los Angeles County Regional Water Control Board Order No. R4-2012-0175 as amended by State Water Board Order WQ 2015-0075, NPDES PERMIT NO. CAS004001, the Contractor is required to eliminate pollution to waters of the United States in regards to this Project. This Project will require the Contractor to implement "Best Management Practices".

The Contractor shall submit a Storm Water Pollution Protection Plan (SWPPP) and a Water Pollution Control Pan (WPCP), as applicable for the Project. The Contractor shall confirm that all of the Best Management Practices (BMP's) have been adequately detailed that addresses his or her anticipated construction operations and meets the intent of the NPDES requirements. The Contractor shall obtain a Notice of Intent (NOI) from the State Water Resources Control Board and pay all related fees, as applicable to the area of disturbance. The NOI shall be submitted as part of the WPCP. After the Notice of Award, the Contractor shall submit to the City a finalized and signed WPCP, which establishes the construction BMP requirements, for review and approval. No work will be allowed to begin without an approved WPCP on file with the City.

The Contractor shall utilize Best Management Practices (BMP's) outlined in the WPCP during construction to ensure that sediment from storm runoff and construction activities does not enter storm drains. Some of the primary Water Pollution Control measures anticipated for this Project include, but are not limited to, covering all storm drain inlets in the Project vicinity with water permeable fabric and gravel bags prior to performing any adjacent AC grinding, removal or paving operations or PCC ramp lip grinding; properly fueling and cleaning all equipment/vehicles; maintaining an ample supply of gravel/sand bags on-hand when excavating new PCC sidewalk/ramp/curb/gutter improvements in the event of rain; properly containing all PCC treatment materials such as the coloring agents, exposed aggregate etching chemicals and surface treatment chemicals required to install the detectable warning mats; properly covering all incoming material trucks and all out going debris hauling vehicles; providing restroom facilities for workers; and regular street sweeping of the work area and haul routes to the satisfaction of the Owner's Representative.

It is anticipated that storm, surface or other waters will be encountered at various times and locations during the work herein contemplated. The Contractor, by submitting a bid, acknowledges that he has investigated the risk arising from such waters and has prepared his bid accordingly, and Contractor, by submitting a bid, assumes all of said risk. The Contractor shall provide and maintain at all times during construction ample means and devices to promptly remove and properly dispose of all water entering the excavations or other parts of the work. No concrete footing or floor shall be laid in water nor shall water be allowed to rise over them until the concrete or mortar has set at least two (2) hours. Water shall not be allowed to rise unequally against any walls for a period of twenty-eight (28) days. Dewatering for the structures and pipelines shall commence when ground water is first encountered, and shall be continuous until such time as water can be allowed to rise in accordance with the above statement. Dewatering shall be accomplished by well points or some other method which will insure a dry hold and preservation of final lines and grade of the bottoms of excavation, all subject to the approval of the City Engineer.

Dewatering methods and disposal of water from dewatering operations shall be the sole responsibility of the Contractor and shall conform to the requirements of the State Regional Water Quality Control Board, the requirements of the National Pollution Discharge Elimination System (NPDES), and the Federal Clean Water Act. Full compensation for dewatering shall be considered as included in the contract prices paid for the related items of work, and no additional compensation will be allowed therefore.

3-13 COMPLETION, ACCEPTANCE AND WARRANTY

3-13.2 Acceptance [Add the following]:
Work will be deemed accepted on the same date when the Notice of Completion is recorded with the Los Angeles County Recorder.

3-13.3 Warranty. [Add the following]:
This sub-section does not in any way limit any guarantee on any item for which a longer guarantee is specified, or on any item for which a manufacturer gives a guarantee for a longer period, nor does it limit other remedies to the City in respect to latent defects, fraud or implied warranties. Contractor shall furnish the City all appropriate guarantee or warranty certificates upon completion of the project.

SECTION 4 - CONTROL OF MATERIALS

4-2 PROTECTION

4-2.1 General [Add the following new subsection]
Until Acceptance of the Work, the Contractor shall have the responsibility, charge and care of the Work and of the materials to be used therein (including materials for which it has received partial payment or materials which have been furnished by the City) and shall bear the risk of injury, loss or damage to any part thereof by the action of the elements or from any other cause, whether arising from the execution or from the non-execution of the Work.

The Contractor shall rebuild, repair, restore, and make good all injuries, losses, or damages to any portion of the work or the material occasioned by any cause before its completion and acceptance and shall bear the expense thereof. Where necessary to protect the work or materials from damage, the Contractor shall at his expense provide suitable drainage and erect such temporary structures as are necessary to protect the work or materials from damage. The suspension of the work from any cause whatever shall not relieve the Contractor of his responsibility for the work and materials as herein specified. If ordered by the City Engineer, the Contractor shall at his expense properly store materials which have been partially paid for by the City or which have been furnished by the City. Such storage by the Contractor shall be on behalf of the City, the City shall at all times be entitled to the possession of such materials, and the Contractor shall promptly return the same to the site of the work when requested. The Contractor shall not dispose of any of the materials so stored, except on written authorization from the City.

In an emergency affecting the safety of life or property, including adjoining property, the Contractor, without special instructions or authorizations, is authorized to act at his discretion to prevent such threatened loss or injury, and he shall so act as though instructed to do so by the City.

4-3 INSPECTION

4-3.1 General. [Add the following]:

The City will pay for inspection and materials testing. The Contractor shall pay for retests and re-inspections due to failure to meet Specifications. If the Contractor elects to work under this Contract more than 8 hours/day or more than 40 hours/week, Saturday, Sunday, or City holidays, if said weekend and holiday work is approved by the City Engineer, it shall arrange with the Engineer for the required inspection service and pay the Special Inspection Fees as provided by the Material Inspector and City Engineer. When Special Inspection is required, the Contractor shall notify the City and pay inspection fees 24 hours in advance. A 24-hour advance notice will be given during working hours, exclusive of Saturday, Sunday or City holidays for the purpose of permitting the Engineer to make necessary assignments of his representatives. If the Contractor is directed by the City to work under this Contract more than 8 hours/day or more than 40 hours/week, the Special Inspection Fee requirements will be waived.

SECTION 5 – LEGAL RELATIONS AND RESPONSIBILITIES

5-1 LAWS AND REGULATIONS. [Add the following]:
The Contractor, and all subcontractors, suppliers and vendors, shall comply with all City, State, and Federal orders regarding affirmative action to ensure equal employment opportunities and fair employment practices. Failure to file any report due under said orders will result in suspension of periodic progress payments.

The Contractor shall ensure unlimited access to the job site for all equal employment opportunity compliance officers.

5-3 LABOR.

5-3.2 Prevailing Wages [Add the following]:
The City has determined that the work on this Project requires work of labor categories which are subject to the State of California Department of Industrial Relations prevailing rates of per diem wages and/or the Davis-Bacon Federal Wage Rates, whichever are higher.

Contractor is aware of the requirements of California Labor Code Section 1720, et seq., and 1770, et seq., as well as California Code of Regulations, Title 8, Section 16000, et seq., ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on "public works" and "maintenance" projects. Contractor agrees to fully comply with all applicable federal and state labor laws (including, without limitation, if applicable, the Prevailing Wage Laws). It is agreed by the parties that, in connection with the work provided pursuant to the Agreement, Contractor shall bear all risks of payment or non-payment of prevailing wages under California law, and Contractor hereby agrees to defend, indemnify, and hold the City, its elected officials, officers, employees, and agents free and harmless from any claim or liability arising out of any failure or alleged failure to comply with the Prevailing Wage Laws. The foregoing indemnity shall survive termination of the Agreement.

Contractor understands and agrees to comply with the following California Labor Code compliance conditions [Labor Code Sections 1720 et seq., 1813, 1860, 1861, 3700]:

a) The Agreement is subject to the provisions of Division 2, Part 7, Chapter 1 (commencing with Section 1720) of the California Labor Code relating to public works and the awarding public agency ("City") and Contractor agree to be bound by all the provisions thereof as though set forth in full herein.

b) Contractor shall be registered with the Department of Industrial Relations ("DIR") in accordance with California Labor Code Section 1725.5 and has provided proof of registration to City prior to the effective date of this Agreement.

c) Contractor agrees to comply with the provisions of California Labor Code Sections 1771, 1774 and 1775 concerning the payment of prevailing rates of wages to workers and the penalties for failure to pay prevailing wages. The applicable prevailing wage determination(s) may be obtained at https://www.dir.ca.gov/OPRL/DPreWageDetermination.htm. The Davis-Bacon Federal Wage Rates are available here: https://sam.gov/content/wage-determinations. It shall be mandatory upon the Contractor to whom the contract is awarded and upon any subcontractor to pay not less than said specified rates to all workers employed by them in the execution of the contract, whichever is greater. A copy of said rates shall be posted at each job site during the course of construction. The Contractor and all subcontractors shall comply with all provisions of the California Labor Code relating to prevailing wage rates, including Sections 1770–1781.
A copy of said rates shall be posted at each job site during the term of this Agreement.

d) Pursuant to California Labor Code Section 1771.4, Contractor's services are subject to compliance monitoring and enforcement by the Department of Industrial Relations. Contractor shall post job site notices as prescribed by DIR regulations and furnish the records specified in California Labor Code Section 1776 directly to the Labor Commissioner in the manner prescribed by California Labor Code Section 1771.4(a)(3) and (c)(2).

e) Eight (8) hours of labor shall constitute a legal day's work for all workmen employed in the execution of this Agreement, and the Contractor and any subcontractor shall comply with and be governed by the laws of the State of California having to do with working hours set forth in Division 2, Part 7, Chapter 1, Article 3 of the California Labor Code. Contractor shall comply with the provisions of California Labor Code Section 1813 concerning penalties for workers who work excess hours. Contractor shall, as a penalty to the City, forfeit twenty-five dollars ($25) for each worker employed in the execution of this Agreement by the Contractor or by any subcontractor for each calendar day during which such worker is required or permitted to work more than eight (8) hours in any one calendar day and forty (40) hours in any one calendar week in violation of the provisions of Division 2, Part 7, Chapter 1, Article 3 of the California Labor Code. (*See, e.g.,* Cal. Labor Code §1815.)

f) Pursuant to California Labor Code Section 1771.1, Contractor and any subcontractor shall not be qualified to bid on, be listed in a bid Proposal, subject to the requirements of Section 4104 of the California Public Contract Code, or engage in the performance of any contract for public work on a public works project unless registered with the DIR and qualified to perform public work pursuant to California Labor Code Section 1725.2. It is not a violation of California Labor Code Section 1771.1 for an unregistered contractor to submit a bid that is authorized by California Business and Professions Code Section 7029.1 or by California Public Contract Code Section 10164 or 20103.5, provided the contractor is registered to perform public work pursuant to Section 1725.5 at the time the contract is awarded. Contractor shall not perform any work under this Agreement with any subcontractor who is ineligible to perform work on the public works project pursuant to Section 1777.1 or 1777.7 of the California Labor Code.

Apprentices

Section 1777.5 requires the Contractor or Subcontractor employing tradesmen in any apprenticeable occupation to apply to an applicable apprenticeship committee that can supply apprentices to the site of the public works project and which administers the apprenticeship program in that trade for a certificate of approval. The certificate will also fix the ratio of apprentices to journeymen to be used in the performance of the Contract.

The Contractor is required to make contributions to funds established for the administration of apprenticeship programs if he employs registered apprentices or journeymen in any apprenticeable trade and if other Contractors on the public works site are making such contributions.

Information relative to apprenticeship standards, contributions, wage schedules and other requirements may be obtained from the State Director of Industrial Relations or from the Division of Apprenticeship Standards.

5-3.3 Payroll Records. [Add the following]:
Contractor shall comply with the provisions of California Labor Code Section 1776 which, among other things, require Contractor and each subcontractor to (1) keep accurate payroll records, (2) certify and make such payroll records available for inspection as provided by Section 1776, and (3) inform the City of the location of the records. The Contractor is responsible for compliance with Section 1776 by itself and all of its subcontractors. Verified payroll records shall be submitted to the City by the tenth day of each month. Progress payments will be withheld pending receipt of any outstanding reports.

5-4 INSURANCE.
5-4.1 General. [Add the following]:
Contractor shall obtain, maintain, and keep in full force and effect during the term of this Agreement, at its sole cost and expense, and in a form and content satisfactory to City, all insurance required under this section. Contractor shall not commence any work or services under this Agreement unless and until it has provided evidence satisfactory to City that it has secured all insurance required under this section. If Contractor's existing insurance policies do not meet the insurance requirements set forth herein, Contractor agrees to amend, supplement or endorse the policies to do so.

5-4.2 General Liability Insurance. [Replace with the following]:
As a condition precedent to the effectiveness of this Agreement, and without limiting the indemnity provisions set forth in this Agreement, Contractor shall obtain and maintain in full force and effect during the term of this Agreement, including any extension thereof, the following policies of insurance:

A. Commercial General Liability Insurance. Contractor shall obtain and maintain, in full force and effect throughout the term of this Agreement, a policy of Commercial General Liability Insurance (Insurance Services Office form CG 00 01) written on an occurrence basis with limits of at least five million dollars ($5,000,000.00) per occurrence, five million dollars ($5,000,000.00) in the general aggregate, and five million dollars ($5,000,000.00) for completed operations aggregate. Defense costs shall be paid in addition to the limits. The policy shall contain no endorsements or provisions limiting coverage for (1) contractual liability; (2) cross liability exclusion for claims or suits by one insured against another; or (3) contain any other exclusion contrary to the Agreement.

B. Automobile Liability Insurance. Contractor shall obtain and maintain, in full force and effect throughout the term of this Agreement, a policy of Automobile Liability Insurance (Insurance Services Office form CA 001) written on a per occurrence basis with limits of at least five million dollars ($5,000,000.00) combined limit for each occurrence covering bodily injury and property damage. The policy shall specifically include coverage for owned, non-owned, leased, and hired automobiles.

C. Workers' Compensation Insurance. Contractor shall obtain and maintain, in full force and effect throughout the term of this Agreement, a policy of Workers' Compensation Insurance in at least the minimum statutory amounts, and in compliance with all other statutory requirements, as required by the State of California. Contractor agrees to waive and obtain endorsements from its workers' compensation insurer waiving all subrogation rights under its workers' compensation insurance policy against the City, its officials, officers, employees, agents and volunteers, and to require each of its subcontractors, if any, to do likewise under their workers' compensation insurance policies. Contractor shall obtain and maintain, in full force and effect throughout the term of this Agreement, a policy of Employer's Liability Insurance written on a per occurrence basis with limits of at least one million dollars ($1,000,000.00) per accident for bodily injury or disease.

5-4.5 Acceptability of Insurers. [Add the following new Subsection]:
Insurance required by this section shall be issued by a licensed company authorized to transact business in the state by the Department of Insurance for the State of California with a current rating of A-:VII or better (if an admitted carrier), or a current rating of A:X or better (if offered by a non-admitted insurer listed on the State of California List of Approved Surplus Line Insurers (LASLI), by the latest edition of A.M. Best's Key Rating Guide, except that the City will accept workers' compensation insurance from the State Compensation Fund. In the event the City determines that the work or services to be performed under this Agreement creates an increased or decreased risk of loss to the City, the Contractor agrees that the minimum limits of the insurance policies may be changed accordingly upon receipt of written notice from the City. Contractor shall immediately substitute any insurer whose A.M. Best rating drops below the levels specified herein.

5-4.6 Insurance Endorsements. [Add the following new Subsection]:
Required insurance policies shall not be in compliance if they include any limiting provision or endorsement that has not been submitted to the City for written approval. Required insurance policies shall contain the following provisions, or Contractor shall provide endorsements on forms approved by the City to add the following provisions to the insurance policies:

A. The policy or policies of insurance required by this section for Commercial General Liability and Automobile Liability Insurance shall be endorsed to provide the following:

(1) Additional Insured: The City, its officials, officers, employees, agents and volunteers, shall be additional insureds with regard to liability and defense of suits or claims arising out of the performance of the Agreement; and

(2) Additional Insured Endorsements: Additional insured endorsements shall not (1) be restricted to "ongoing operations", (2) exclude "contractual liability", (3) restrict coverage to "sole" liability of Contractor, or (4) contain any other exclusions contrary to the Agreement; and, the coverage shall contain no special limitations on the scope of protection afforded to additional insureds.

(3) Notice: The policy or policies of insurance required by this section for Commercial General Liability and Automobile Liability Insurance shall be endorsed to state that coverage shall not be suspended, voided, cancelled, or modified, or reduced in coverage or in limits, except after thirty (30) days prior written notice by First Class U.S. Mail, postage-prepaid, has been provided to the City. Notwithstanding the foregoing, if coverage is to be suspended, voided, or cancelled because of Contractor's failure to pay the insurance premium, the notice provided to City shall be by ten (10) days prior written notice.

B. For all policies of Commercial General Liability Insurance, Contractor shall provide endorsements for completed operations to effectuate this requirement.

5-4.7 Deductibles and Self-Insured Retentions. [Add the following new Subsection]:
Any deductible or self-insured retention must be approved in writing by the City in advance and shall protect the City, its officials, officers, employees, agents and volunteers, in the same manner and to the same extent as they would have been protected had the policy or policies not contained a deductible or self-insured retention.

5-4.8 Primary and Non-Contributing Insurance. [Add the following new Subsection]:
All policies of Commercial General Liability Insurance and Automobile Liability Insurance shall be primary and any other insurance, deductible, or self-insurance maintained by the City, its officials, officers, employees, agents or volunteers, shall not contribute with this primary insurance. Policies shall contain or be endorsed to contain such provisions.

5-4.9 Waiver of Subrogation. [Add the following new Subsection]:
All policies of Commercial General Liability and Automobile Liability Insurance shall contain or be endorsed to waive subrogation against the City, its officials, officers, employees, agents and volunteers, or shall specifically allow Contractor or others providing insurance evidence in compliance with the requirements set forth in this section to waive their right to recovery prior to a loss. Contractor hereby agrees to waive its own right of recovery against the City, its officials, officers, employees, agents and volunteers, and Contractor hereby agrees to require similar written express waivers and insurance clauses from each of its subcontractors.

5-4.10 Evidence of Coverage. [Add the following new Subsection]:
Concurrently with the execution of the Agreement, Contractor shall deliver certificates of insurance together with original endorsements affecting each of the insurance policies required by this section. Required insurance policies shall not be in compliance if they include any limiting provision or endorsement that has not been submitted to the City for written approval. The certificates of insurance and original endorsements for each insurance policy shall be signed by a person authorized by that insurer to bind coverage on its behalf. At least fifteen (15) days prior to the expiration of any such policy, evidence of insurance showing that such insurance coverage has been renewed or extended shall be filed with the City. If such coverage is cancelled or reduced and not replaced immediately so as to avoid a lapse in the required coverage, Contractor shall, within ten (10) days after receipt of written notice of such cancellation or reduction of coverage, file with the City evidence of insurance showing that the required insurance has been reinstated or has been provided through another insurance company or companies. Contractor shall promptly furnish, at City's request, copies of actual policies including all declaration pages, endorsements, exclusions and any other policy documents City requires to verify coverage.

5-4.11 Requirements Not Limiting. [Add the following new Subsection]:

Requirement of specific coverage or minimum limits contained in this section are not intended as a limitation on coverage, limits, or other requirements, or a waiver of any coverage normally provided by any insurance. Nothing in this section shall be construed as limiting in any way the indemnification provision contained in this Agreement, or the extent to which Contractor may be held responsible for payments of damages to persons or property.

5-4.12 Enforcement of Agreement (Non-Estoppel). [Add the following new Subsection]:
Contractor acknowledges and agrees that actual or alleged failure on the part of the City to inform Contractor of any non-compliance with any of the insurance requirements set forth in this section imposes no additional obligation on the City nor does it waive any rights hereunder.

5-4.13 Insurance for Subcontractors. [Add the following new Subsection]:
Contractor shall either: (1) include all subcontractors engaged in any work or services for Contractor relating to this Agreement as additional named insureds under the Contractor's insurance policies; or (2) Contractor shall be responsible for causing its subcontractors to procure and maintain the appropriate insurance in compliance with the terms of the insurance requirements set forth in this section, including adding the City, its officials, officers, employees, agents and volunteers, as additional insureds to their respective policies. All policies of Commercial General Liability Insurance provided by Contractor's subcontractors performing any work or services related to this Agreement shall be endorsed to name the City, its officials, officers, employees, agents and volunteers, as additional insureds. Contractor shall not allow any subcontractor to commence any work or services relating to this Agreement unless and until it has provided evidence satisfactory to City that the subcontractor has secured all insurance required under this section.

5-4.14 Other Insurance Requirements. [Add the following new Subsection]:
The following terms and conditions shall apply to the insurance policies required of Contractor pursuant to this Agreement:

A. Contractor shall provide immediate written notice to City if (1) any of the insurance policies required herein are terminated, cancelled or suspended, (2) the limits of any of the insurance coverages required herein are reduced, or (3) the deductible or self-insured retention is increased.

B. All insurance coverage and limits provided by Contractor and available or applicable to this Agreement are intended to apply to each insured, including additional insureds, against whom a claim is made or suit is brought to the full extent of the policies. Nothing contained in this Agreement or any other agreement relating to the City or its operations shall limit the application of such insurance coverage.

C. None of the insurance coverages required herein will be in compliance with the requirements of this section if they include any limiting endorsement which substantially impairs the coverages set forth herein (e.g., elimination of contractual liability or reduction of discovery period), unless the endorsement has first been submitted to the City and approved in writing.

D. Certificates of insurance will not be accepted in lieu of required endorsements, and submittal of certificates without required endorsements may delay commencement of the Project. It is Contractor's obligation to ensure timely compliance with all insurance submittal requirements as provided herein.

E. Contractor agrees to ensure that subcontractors, if any, and any other parties involved with the Project who are brought onto or involved in the Project by Contractor, provide the same minimum insurance coverage required of Contractor. Contractor agrees to monitor and review all such coverage and assumes all responsibility for ensuring that such coverage is provided in conformity with the requirements of this section. Contractor agrees that upon request, all agreements with subcontractors and others engaged in the Project will be submitted to the City for review.

F. Contractor agrees to provide immediate written notice to City of any claim, demand or loss against Contractor arising out of the work or services performed under this Agreement and for any other claim, demand or loss which may reduce the insurance available to pay claims, demands or losses arising out of this Agreement.

5-4.15 Contractor's Liability; City Not Liable; Claims Resolution. . [Add the following new Subsection]:

A. Contractor's liability. The Contractor shall be responsible for any loss or damage that may occur to:

- The work or any part thereof;
- Any of the materials or other things used or employed in performing the work;
- Any injury to any person or persons, either workers or the public;
- Any damage to property resulting from any cause which might have been prevented by the Contractor, including defects or obstructions at any time before completion of the work and its final acceptance.

B. City ordered precautions. If, in the opinion of the City Engineer, the precautions taken by Contractor are not safe or adequate at any time during the term of the Contract, the City Engineer may order the Contractor to take further precautions, and if the Contactor shall fail to do so, the City Engineer may order the work done by others and charge the Contractor for the cost thereof, such cost to be deducted from any moneys due or becoming due the Contractor. Failure of the City Engineer to order such additional precautions, however, shall not relieve the Contractor from his full responsibility for public safety.

C. City not liable. The City shall not be answerable or accountable in any manner, for any loss or damage that may occur to any of the following from any cause which might have been prevented by the Contractor:

- The work or any part thereof;
- Any of the materials or other things used or employed in performing the work;
- Any injury to any person or persons, either workers or the public;
- Any damage to property.

D. Claims Resolution. From time to time during the period of this contract, the City and/or the Contractor may be served with third-party claims, as a result of alleged conduct by Contractor. The following procedures shall be followed by City and Contractor:

For claims received by Contractor:

(1) Contractor shall provide City on a monthly basis details regarding any claim for damages to persons or property, including, date claim made, date of alleged damages, type of

damages, alleged cause of damages and, as claims are resolved, details regarding Contractor's denial or payment of such claim and the reasons for denial or payment.

(2) Contractor shall resolve or deny any claim received within thirty (30) days of receipt. If Contractor is unable to resolve a claim within the thirty (30) days set forth above, it shall, prior to the expiration of the thirty (30) days request and extension in writing from the City.

For claims received by City:

(1) City shall process any claims received pursuant to Section 2520. Claims. of the Lakewood Municipal Code.

(2) If after investigation of the claim, the City determines the Contractor is liable under this Contract, City shall tender the claim to the Contractor for proper handling and resolution.

E. Retention of Claimed Damages by City. The City may retain so much of the money due the Contractor under and by virtue of the Contract as shall be considered necessary by the City until disposition has been made of such suits or claims for damages aforesaid.

5-7 SAFETY.

5.7.2 Safety Orders

5.7.2.1 General. [Add the following]:
The Contractor shall comply with the provisions of any City ordinances or regulations regarding requirements for the protection of excavations and the nature of such protection.

SECTION 6 - PROSECUTION AND PROGRESS OF THE WORK

6-1 CONSTRUCTION SCHEDULE AND COMMENCEMENT OF WORK.

6-1.0 General. [Add the following Subsection]:
The Contractor's proposed Construction Schedule shall be submitted to the Engineer within ten (10) days after the date of the formal Notice of Apparent Low Bidder. The schedule shall be supported by written statements from each supplier of materials or equipment indicating that all orders have been placed and acknowledged, and setting forth the dates that each item will be delivered. The schedule shall establish the order of work which minimizes disruption of existing travel lanes.

Prior to issuing the Notice to Proceed, the Engineer will schedule a preconstruction meeting with the respective Contractor to review the proposed Construction Schedule and delivery dates, arrange the utility coordination, discuss construction methods, and clarify inspection procedures.

The Contractor shall submit periodic Progress Reports to the Engineer by the tenth day of each month. The report shall include an updated Construction Schedule. Any deviations from the original schedule shall be explained. Liquidated damages will be assessed pending receipt of any outstanding reports, as set forth in Section 6-9.1 below.

6-1.3 Construction Schedule (Critical Path Method) [Add the following Subsection]:
The Contractor shall submit to the Engineer practicable critical path method (CPM) progress schedules in conformance with these Special Provisions. Whenever the term "schedule" is used

in this section it shall mean CPM progress schedule illustrated by the Gantt Bar method. The schedule shall be prepared by qualified and experienced scheduling staff.

Schedules shall show the order in which the Contractor proposes to carry out the work with logical links between time-scaled work activities, and calculations made using the critical path method to determine the controlling operation or operations. The Contractor is responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

The Contractor shall produce schedules using computer software and shall furnish compatible software for the Engineer's exclusive possession and use. The Contractor shall furnish network diagrams, narrative reports, tabular reports and schedule data as parts of each schedule submittal.

The number of activities shall be sufficient to assure adequate planning of the Project, to permit monitoring and evaluation of progress, and to do an analysis of time impacts.

Schedule activities shall include the following:

A. A clear legible description.
B. Start and finish dates.
C. A duration of not less than one working day, except for event activities, and not more than 20 working days, unless otherwise authorized by the Engineer.
D. At least one predecessor and one successor activity, except for Project start and finish milestones.
E. Required constraints.
F. Codes for responsibility, stage, work shifts, location and contract pay item numbers.

The Contractor may show a scheduled completion date that is later than the Contract completion date on an update schedule, after the baseline schedule is accepted. The Contractor shall provide an explanation for a late scheduled completion date in the narrative report that is included with the schedule.

The Engineer's review and acceptance of schedules shall not waive any Contract requirements and shall not relieve the Contractor of any obligation thereunder or responsibility for submitting complete and accurate information. Schedules that are rejected shall be correct by the Contract and resubmitted to the Engineer within five (5) working days of notification by the Engineer, at which time a new review period of one week will begin.

Errors or omissions on schedules shall not relieve the contractor from finishing all work within the time limit specified for completion of the Contract. If, after, a schedule has been accepted by the Engineer, either the Contractor or the Engineer discovers that any aspect of the schedule has an error or omission, it shall be corrected by the Contractor on the next schedule.

Payment for the Project schedule and revisions/updates to the schedule shall be made under other items of work and no additional payment shall be made therefore.

6-1.4 Acceleration. [Add the following Subsection]:

The City reserves the right to accelerate the work of the Contract at any time during its performance. In the event the City directs acceleration, such directive will be given to the Contractor in writing. The Contractor shall keep cost and other Project records related to the acceleration directive separately from the normal Project cost records and shall provide a written record of acceleration costs to the City on a daily basis.

In the event the Contractor believes that some action or inaction on the part of the City constitutes an acceleration directive, the Contractor shall immediately notify the City in writing that the Contractor considers the actions or inactions an acceleration directive. The Contractor shall not accelerate their work efforts until the City responds to the written notification. If acceleration is then directed or required by the City, all cost records referred to in the previous paragraph shall be maintained by the Contractor and provided to the City on a daily basis.

In order to recover additional costs due to acceleration, the Contractor must document that additional expenses were incurred and paid by the Contractor. Labor costs recoverable will only be overtime or shift premium costs or the cost of additional laborers brought to the site to accomplish the accelerated work effort. Equipment costs recoverable will only be the cost of added equipment mobilized to the site to accomplish the accelerated work effort.

6-3 TIME OF COMPLETION.

6-3.1 General. [Add the following to this section]:

The time for completion shall be as set forth in the General Provisions.

6-3.2 Contract Time Accounting. [Add the following]:

The Contractor's activities shall be confined to the hours between 7:00 AM and 4:00 PM, Monday through Friday, excluding holidays, unless otherwise specified. Work shall be prohibited any time on Saturday, Sunday or Federal Holidays except as provided herein. Deviation from these hours will not be permitted without the prior consent of the Engineer, except in emergencies involving immediate hazard to persons or property.

In the event of either a requested or emergency deviation, inspection service fees will be charged against the Contractor. The service fees will be calculated at overtime rates (premium time) including benefits, overhead, and travel time and are established based on the City's current fee schedule or professional services agreement for construction inspection services. The service fees will be deducted from any amounts due the Contractor.

Construction activities during City Special Events may be restricted by City to exclude all or part of the work on primary arterial or access roads to the Special Events as determined by Engineer. The Contractor shall be responsible to ascertain the exact times of any such events within his proposed construction schedule which may restrict his operation and shall adjust his schedule accordingly. The construction restrictions shall only be for the actual days the events occur. All costs for maintaining traffic control, protection of work site and re-mobilization shall be deemed as included in the lump sum contract for their respective items and no additional compensation will be allowed.

6-9 LIQUIDATED DAMAGES. [Add the following]:

It is agreed by the parties to the Contract that time is of the essence and that in the case that all the work is not complete before or upon the expiration of the time limit set forth, damage will be sustained by the City. For each consecutive calendar day in excess of the time specified for the completion of the work, the Contractor shall pay to the City $500.00. In addition, the City shall

have the right to charge to the Contractor and to deduct from payments for the work the actual cost to the City of engineering, inspection, superintendence, and other overhead expenses, which are directly chargeable to the Contract and which accrue during the period of such delay. The expenses and damages described above shall be deducted from any money due the Contractor under this contract. The Contractor and his sureties shall be liable for any excess cost.

6-9.1 Additional Liquidated Damages. [Add the following Subsection]:
Additional liquidated damages will also be assessed in the amount of $500.00 per calendar day for failure to timely submit periodic progress reports as described in Section 6 of these Special Provisions.

SECTION 7 - MEASUREMENT AND PAYMENT

7-3 PAYMENT.

7-3.2 Partial and Final Payment. [Add the following to this section]:

The closure date for periodic progress payments will be five (5) working days prior to the first Monday of each month. The final progress payment will not be released until the Contractor returns the control set of Plans and Specifications showing the as-constructed conditions.

If there is no specific bid item for a particular item of work, full compensation for such work shall be considered as included in the prices bid for other items of work.

SUBSTITUTION OF SECURITIES

In conformance with Public Contract Code Section 22300, the Contractor may substitute securities for any monies withheld by the City to ensure performance under the Contract Agreement.

At the request and expense of the Contractor, the Contractor has the option to deposit securities, which have been approved by the City, and deposited with a State or Federally chartered bank as the escrow agent. Said securities will be used as a substitute for retention earnings required to be withheld by the City, pursuant to the construction contract. The Contractor shall be the beneficial owner of any securities substituted for moneys withheld and shall receive interest thereon. Said securities shall have no obligation to any other construction contract for substitution of securities in lieu of retention. When the Contractor deposits the City approved securities with the escrow agent, the escrow agent shall notify the City within 10 calendar days of the deposit. Said securities shall be evaluated quarterly by the escrow agent to verify the current market value. If the current market value of said securities falls below the required amount, the escrow agent shall notify the Contractor and require additional securities and/or cash to be submitted for City approval, and be held in the escrow account to meet the Contractor's obligations. Said securities shall be held by the escrow agent until such time as the escrow agent receives written notification from the City that the Contractor has satisfactorily completed his contract obligations.

Alternatively, the Contractor may request and the City shall make payment of retention earned directly to the escrow agent at the expense of the Contractor. The Contractor may direct the investment of the payment into securities and the Contractor shall receive the interest earned on the investments upon the same terms provided for securities deposited by the Contractor.

The type of securities deposited and the method of release shall be approved by the City Attorney's office.

The full five percent (5%) retention will be deducted from all payments. The City shall hold retainage from the Contractor and shall make prompt and regular incremental acceptances of portions, as determined by the City, of the Contract work, and pay retainage to the Contractor based on these acceptances. The Contractor, or subcontractor, shall return all monies withheld in retention from a subcontractor within 30 days after receiving payment for work satisfactorily completed and accepted including incremental acceptances of portions of the Contract work by the City. Federal law (49 CFR Section 26.29) requires that any delay or postponement of payment over 30 days may take place only for good cause and with the City's prior written approval. Any violation of this provision shall subject the violating Contractor or subcontractor to the penalties, sanctions and other remedies specified in Section 7108.5 of the Business and Professions Code. These requirements shall not be construed to limit or impair any contractual, administrative, or judicial remedies otherwise available to the Contractor or subcontractor in the event of a dispute involving late payment or nonpayment by the Contractor, deficient subcontract performance, or noncompliance by a subcontractor.

The final retention will be authorized for payment thirty-five (35) days after the date of recordation of the Notice of Completion. . The City may withhold from release of the final retention amounts authorized under Public Contracts Code Section 7107 and/or 125% of amounts identified in any Stop Notices received by the City.

7-3.3 Delivered Materials. [Add the following to this section]:

Materials and equipment delivered but not incorporated into the work shall not be included in the estimate for progress payment.

7-3.4 Mobilization. [Add the following to this section]:

Mobilization shall consist of preparatory work and operations, including but not limited to those necessary for the movement of personnel, equipment, supplies, and incidentals to the Project site; for the establishment of all offices, buildings and other facilities necessary for the work on this Project; and for all other work and operations which must be performed or cost incurred prior to beginning work on the various contract items on the Project site. Mobilization is deemed to include all aspects of mobilization and de-mobilization work occurring during the life of the Project for any reason.

Full compensation for mobilization shall be included in other items of work and shall include full compensation for all costs incurred by the Contractor for doing all the work involved in mobilization and demobilization as specified herein, and no additional compensation will be allowed.

SECTION 8 – FACILITIES FOR AGENCY PERSONNEL

8-6 BASIS OF PAYMENT. [Add the following]

Within fourteen (14) calendar days after receipt of the Notice to Proceed, the Contractor shall submit written statement to the City detailing its field office overhead costs which are time related. The City will review this first cost submittal and reach a written agreement with the Contractor on a daily field office overhead cost rate which shall be memorialized in a no cost change order. The

daily rate agreed to in this change order will be applicable throughout the duration of the Contract. No field office costs will be paid until such an agreement is reached between the City and the Contractor and the change order concerning this daily rate is executed by both parties. Progress payments will be withheld pending receipt of the above-referenced cost submittal and executed change order.

The individual cost components of the daily field office overhead rate shall represent costs which increase as a direct result of any time extension caused solely and exclusively by an act or omission of the City. This listing may include such cost items as on-site project management, supervision, Engineering and clerical salaries; on-site utilities and rent; on-site company vehicles and their operating expenses; and site maintenance and security expenses. Field office overhead costs which are unaffected by increased time shall not be allowable cost in calculating the daily field office overhead rate. These non-time related costs include, but are not limited to, acquisition and installation of stationary equipment; temporary construction facilities; utilities and office furnishings (unless such items are rented or leased); the preparation of the site including clearing, grubbing, grading, fencing, mobilizations and demobilization costs; and the costs of permits, bonds and insurance coverage for the Project.

The individual wage cost components used to calculate the daily field office rate shall be supported by actual employee payroll records, not salary ranges or estimates. Hourly rates for management, supervisory, engineering, and clerical employees shall be based upon 2080 work hours per year and shall not include allowances for holidays, vacations, or sick time.

When applicable, the daily field office overhead rate shall be multiplied by the number of days the Contract is delayed or extended by change order and shall be added to the agreed upon change order cost. The days of delay shall be those caused solely by the acts or omissions of the City and documented by a time impact analysis prepared and submitted by the Contractor. In the event a deductive change order is issued which reduces time under the Contract, the daily field office overhead rate shall be used to calculate the deductive amount. No allowance for overhead costs and no profit allowance shall be added to the extended field office overhead cost.

SECTION 9 – PAYMENT ITEMS [Add the following Section]

Payment for all bid items shall be as set forth herein. Payment for any items of work required by the contract documents that are not explicitly covered by a contract bid item shall be considered as included in other items of work and no additional compensation shall be allowed therefor.

Payment will be made at the contract unit prices for all bid items, inclusive, per the Project Bid Sheet which shall include costs for furnishing all labor, materials, tools, and equipment, and for performing all the work as described in the following Payment Items, complete in place, per the Plans and Specifications, and as directed by the Engineer.

Payment for Lump Sum Items will be prorated based upon the percentage of work completed as approved by the City Engineer. The Schedule of Values shall be utilized as a guide for the determination of the reasonable percentage of work completed as approved by the City Engineer.

PART 2 - CONSTRUCTION MATERIALS

SECTION 201 – CONCRETE, MORTAR, AND RELATED MATERIALS

201-1 PORTLAND CEMENT CONCRETE.
201-1.1 General. [Add the following]:
The same brand, type and source of cement and aggregate shall be used for all Portland Cement Concrete.

201-2 REINFORCEMENT FOR CONCRETE.

201-2.2.1 Steel Reinforcement. [Add the following]:
All reinforcing steel shall be Grade 60 unless otherwise shown on Plans.

SECTION 203 - BITUMINOUS MATERIALS

203-6.5 TYPE III ASPHALT CONCRETE MIXTURES.

203-6.5.1 Class and Grade. [Add the following]:
Mix design shall be III-C2-PG 64-10.

SECTION 211 - MATERIAL TESTS

211-1.2 Field Density. [Add the following to this section]:
Field density tests will be made by the Engineer during the course of construction at the expense of the City. If field density tests indicate that any portion of the compacted sub-grade has density lower than specified, the Contractor shall rework that portion until the specified density is obtained. Retest of areas, which have failed compaction, will be performed by the Engineer at the Contractor's expense.

SECTION 214 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS [Replace the entire Section with the following]:

214-1 GENERAL.
Traffic stripes and pavement markings shall conform to the State Standard Specifications as described in these specifications.

PART 3 - CONSTRUCTION METHODS

SECTION 300 EARTHWORK

300-1 CLEARING AND GRUBBING

300-1.1 General. [Add the following to this section]:
In addition to the work outlined in Subsection 300-1 of the Standard Specifications, the following items of work are included under Clearing and Grubbing unless otherwise covered by a specific bid item.

1. Mobilization and demobilization.
2. Documentation of existing conditions.
3. Maintain dust control at all times by sweeping; including developing a water supply and furnishing and placing all water required for work done in the contract, including water used for extra work and water used for irrigation purposes.

4. Protection of utilities, trees, fences, walls, and other facilities within the construction zone, except those specifically directed by the Engineer to be removed or relocated.
5. Clearing and removal of debris from site of work.
6. Removal of trees and roots interfering with the work whether specified or shown in the plans.
7. Compliance with Construction and Debris handling requirements as specified herein.
8. Removal of structures, as directed by Engineer to be removed or abandoned.
9. Delay in work necessary to accommodate utility relocations by others.
10. Other items of work as directed in these specifications.

Payment for Clearing and Grubbinh shall be included in other items of work and no additional compensation will be allowed.

300-1.1.1 Preservation of Property. [Add the following Subsection]:
Prior to start of demolition, the Contractor shall document existing conditions adjoining Project limits to establish preconstruction conditions that might be misconstrued as damage caused by site clearing. Contractor shall use sufficiently detailed photographs and videotape to document existing conditions of any damage. Contractor shall provide photographs and videotape to the Engineer upon request. Payment for this work shall be included in all other items of work and no additional compensation will be allowed.

300-1.1.2 Removal and Disposal of Materials. [Add the following Subsection]:
All materials removed, except for materials indicated to be relocated or salvaged, become the property of the Contractor and shall be hauled to and lawfully disposed of at a site secured by the Contractor. The Contractor will provide the Engineer with a letter indicating the final disposition of materials hauled away and disposed offsite from the Project within five (5) working days after Project completion. No removed materials shall be left within the Project limits overnight.

Any existing irrigation system interfering with construction of new improvements shall be removed and relocated. Payment for removal and relocation of interfering existing irrigation system will be considered as included in other items of work and no additional compensation will be allowed.

Any curb drain or parkway drain within limits of removal shall be removed and replaced in kind. Payment for removal and reconstruction or curb drain and parkway drain will be considered as included in other items of work and no additional compensation will be allowed.

Prior to the removal of materials, the Contractor shall coordinate with the regional notification center (Underground Service Alert of Southern California) to mark out all existing utilities per Section 402. Contractor shall confirm location and depth of all existing utilities per Section 402 in order to avoid damage to them during removal operations.

300-1.4 Payment. [Add the following]:

Compensation for Clearing and Grubbing shall be paid for other items of work including all labor, materials, supplies, equipment, disposal, tree and root removal, mobilization and demobilization and no additional compensation will be allowed therefor.

300-2 UNCLASSIFIED EXCAVATION.
300-2.1 General [Add the following]:

Unclassified Excavation shall consist of all saw cutting and excavation of existing pavement as necessary to construct the proposed AC “dig-out” improvements as directed by the Engineer. Removals in AC pavement shall be minimum 3 inch depth and in PC concrete minimum 3 inch depth, or as directed by the Engineer. The Contractor shall be responsible for locating and protecting manhole, water valve and utility access frames and covers or other metal appurtenances buried below the existing surface, whether shown on the plans or not.

All existing asphalt concrete pavement that is to be joined by new construction shall be saw cut in a straight line the full depth of the existing pavement. Contractor shall exercise due caution to avoid any disruption to the existing aggregate base that is to remain below the depth of removal called out on the plans. In addition, the Contractor shall not disturb or damage existing improvements to be protected in place. Any damage done by Contractor and/or its equipment shall be repaired or replaced at Contractor's expense. The Contractor shall call USA prior to excavation and shall “pothole” existing utilities that fall within the proposed pavement ‘dig-out” areas as necessary to determine their depth to avoid damaging said utilities.

Removal of existing pavement sections shall be to the depth required for construction of the replacement roadway sections as shown on the plans, estimated bid quantities (Proposal) and/or as directed by the Engineer before or after the Cold Mill operation, and will include the removal of existing AC pavement and conflicting portions of aggregate base. All removed material becomes the property of the Contractor and shall be hauled and recycled/disposed of properly outside of the roadway right of way.

The use of pavement breaking equipment (stomper) is not permitted. No crushing operations by Contractor will be allowed at the job site or within the Lakewood City limits.

The Contractor shall excavate a length of section of roadway not to exceed the amount of removal and placement of AC base course that can be completed within the same working day. All excavations shall be backfilled as soon as permitted under the specifications so that when the job is closed for the day, the open excavation will be kept at a minimum and adjacent utilities will receive maximum backfill support.

300-2.9 Payment. [Replace with the following]:
Payment for Unclassified Excavation shall be considered included in other items of work bid and no additional compensation will be allowed therefor.

300-4 UNCLASSIFIED FILL

300-4.9 Measurement and Payment. [Add the following to this section]:

Compensation for Unclassified Fill required for asphalt concrete slot paving or digouts, concrete improvements, or minor grading adjacent to concrete improvements shall be included in the cost of constructing those items and no additional compensation will be allowed.

SECTION 301 –SUBGRADE PREPARATION, TREATED MATERIALS, AND PLACEMENT OF BASE MATERIALS

301-1 SUBGRADE PREPARATION

301-1.3 Relative Compaction. [Replace the first paragraph with the following]:

The top 12” of all subgrade shall be compacted to 95% relative compaction.

SECTION 302 - ROADWAY SURFACING

302-5 ASPHALT CONCRETE PAVEMENT.

302-5.9 Placement
302-5.9.1 General. [Add the following]:
The depositing, distributing, and spreading of the asphalt concrete shall be accomplished in a single, continuous operation by means of a self-propelled mechanical spreading and finishing machine designed especially for that purpose. The machine shall be equipped with a screed or strike-off assembly capable of being accurately regulated and adjusted to distribute a layer of the material to a definite predetermined thickness. The machine shall be equipped with automatic screed controls. The automatic screed controls require a reference system for the automatic system to follow. This reference can be the base on which the asphalt concrete is being placed, the lane next to the material being placed, or a string line. The automatic screed control can also follow a traveling reference system. A traveling reference system may be a 30-foot “ski” attached to a control arm, which notes changes in base contours and adjusts the screed automatically to compensate. A string line or traveling reference system shall be used to allow the automatic control to adjust screed height as necessary to maintain proper longitudinal (length-wise) grade of the pavement. To maintain proper transverse (width-wise) grade, the automatic screed control shall use a pendulum system attached to a beam running between the two screed pull arms. When paving is of a size or in a location that use of a self-propelled machine is impractical, the Engineer may waive the self-propelled requirement.

The Contractor shall provide for adequate quality control measures to insure that delivery of asphalt rubber shall be neither too slow nor too fast to prevent stopping of the paving operation and/or cooling of the asphalt rubber material. Material delivery scheduling and handling is critical to optimizing compaction and ride quality. Care shall be take to not start and stop the paving operation such that transvers joints and bumps are created. Regardless, Contractor shall remain responsible for a smooth ride finish of the work.

302-5.9.2 Joints [Add the following]:
The Contractor shall place the overlay such that joints and seams fall within six (6) inches of the lane line for the new delineation. The joint pattern for all pavement layers shall be submitted in writing to the Engineer for review and approval ten (10) working days in advance of the first lift of pavement to be placed. The Engineer’s decisions shall be final.

302-5.10 Rolling. [Add the following to this section]:
Rolling along a joint shall be such that the widest part of the roller is on the hot side of the joint.

302-5.14.5 Measurement and Payment [Add the following]:
Payment for asphalt concrete shall be included in other items of work bid and no additional compensation will be allowed.

302-9 ASPHALT RUBBER HOT MIX (ARHM).

302-17 BITUMINOUS PAVEMENT CRACK SEALING [Add new section]:

302-17.1 General.

Crack seal material shall conform to the following specifications or shall be approved by the City Engineer.

302-17.2 Material.
The asphalt rubber sealant material shall be made with paving grade asphalt and granulated reclaimed rubber. The granulated rubber shall be 100 percent vulcanized and shall meet the following requirements:

Passing Sieve	Percentage
•	No. 8 100
No. 10	98-100
No. 40	0-10

The specific gravity of the granulated rubber shall be 1.15 ± 0.02. The material shall be free of fabric, wire or other contamination materials, except that up to 4 percent of calcium carbonate which may be included to prevent particles from sticking together.

Property	Test Specification	Requirement
Rubber Cement		25 percent ± 2 percent
Cone Penetration	ASTM D3407	25 (+/- 5) (@77° F)
Softening Point	ASTM D36	210° – 220° F
Resilience	ASTM D 3407	50 – 60 percent
Flow (@140° F)	ASTM D3407	0 mm, maximum

The asphalt rubber sealant material shall be accompanied by a certificate of compliance from the manufacturer.

302-17.3 Crack Repairs.
Crack sealant shall be applied to all cracks of 1/8 inch or greater as determined by the City Engineer.

The crack seal material shall be applied a minimum of two (2) weeks in advance of the paving or sealing operation.

The sealant shall not be placed when the pavement temperature is below 50° F, above 90° F or during unsuitable weather.

For cracks in size from 1/4 inch and greater in width the crack shall be widened using a router to form a shallow sealant reservoir which is 3/4 inch wide and 3/4 inch deep.

The cracks shall be cleaned with compressed air to remove all dust and free moisture, and treated with weed killer, immediately prior to filling.

The Contractor shall protect all existing utility covers, traffic detector loops and pull boxes during the routing operation and shall repair or replace any damaged facilities to its original condition. The existing facilities shall include but not be limited to the above items.

All debris resulting from crack routing shall be removed from the roadbed by hand or mechanical sweeping prior to the end of each work day.

Sealant shall be placed from the bottom of the crack upward to the pavement surface in a manner which does not result in sealant bridging or entrapping air pockets.

With deep cracks, settlement may occur, thus requiring application of a second layer of sealant. The level of the sealant will be allowed to be slightly below the level of the existing pavement. Alternatively, for full depth wide cracks, the Contractor may fill the cracks with clean sand and apply a sealant a minimum of ¾ inch thick to seal the crack. All excess sealant shall be removed from the crack with a minimum overlap onto adjacent pavement.

The sealant shall be placed in such a manner that any excess sealant is not spread or squeegeed onto the pavement where cracks are not present, especially between separate individual cracks. The Contractor may be required to furnish and spread sufficient sand necessary to eliminate tracking or damage to the crack sealant. On all arterial highways where sand will be applied over fresh crack sealant, the contractor shall post “Loose Gravel” (C6) construction signs. Signs shall be posted from commencement of crack sealing until all sand has been cleaned from the roadway. The Contractor shall remove all sand by sweeping with 24 hours after opening the street to traffic.

For arterials and collectors, rolling closures during the crack sealing operation shall not be allowed unless approved by the Engineer.

A singular crack shall be considered to be a crack which is not part of a network of cracking of average spacing less than 3-foot in both dimensions. If asphalt concrete pavement is being constructed directly upon an existing asphalt concrete pavement: 1) all singular cracks and joints shall be blown clear with high pressure air; and 2) all visible singular cracks shall be completely filled with Crafco Polyflex Type III or approved equal.

To ensure awareness of crackfill crew of the specification, the foreman on the crackfill work shall fill out the following certificate, have the certificate at the site of the work, and present the certificate to the inspector on request.

CRACKFILL CREW - CERTIFICATE OF PROCEDURES

No work shall begin without this certificate on site, signed by the foreman.

As the on-site supervisor of the crackfill crew, I hereby certify that I am aware of and will provide for application such that: “Crackfiller shall be maintained upon application below the top of cold mill texturing and shall be thoroughly squeegeed immediately thereafter.”

I also certify that I have verified that the crackfill material is the same material shown on the Certification of Compliance, or is the precise product identified in the specifications:

_____

(Crackfill Manufacturer Product Name)

Print Name: _____

_____ _____

Signed Date

302-17.4 Measurement and Payment.
Payment for Bituminous Pavement Crack Sealing shall be included in other items of work bid and no additional compensation will be allowed.

SECTION 303 - CONCRETE AND MASONRY CONSTRUCTION

303-5 CONCRETE CURBS, WALKS, GUTTERS, CROSS GUTTERS, ALLEY INTERSECTIONS, ACCESS RAMPS, AND DRIVEWAYS

303-5.1 Requirements.
303-5.1.1 General. [Add the following]:
Saw cuts shall be made at existing joints or cracks or at least eight (8) feet from an existing joint or crack, and if the saw cut is made at an existing crack, the saw cut shall include the crack within the removal area. Spandrel shall be saw cut a maximum two (2) inches from curb face and a minimum of three (3) inches depth.

The Contractor shall verify with a "smart level" that the ADA required maximum ramp and sidewalk grades are not exceeded both when marking the required saw cut removal limits and when setting the concrete forms, prior to pouring any curb ramp locations. It shall be the Contractor's responsibility to supervise and utilize the proper experienced personnel to ensure that the proper saw cut limits are established for all curb ramp locations. The City shall not be responsible to direct the Contactor's crews or otherwise serve in this management capacity. The City shall be present to verity the concrete forms, prior to pouring any PCC construction improvements.

Adjacent asphalt and base removal and replacement with full depth AC base course, associated with the curb and gutter reconstruction, shall be a minimum depth of 6-inches and a minimum width of 18-inches and shall conform to the requirements established elsewhere in these Special Provisions.

Note that existing traffic signal and interconnect conduits may be located at shallow depths under the existing PCC sidewalks at signalized intersections. The Contractor shall use extreme caution when removing existing PCC curb and gutter. The Contractor shall notify USA Dig Alert to identify existing utilities within the Project limits.

The sidewalk and curb ramp work shall include all related adjustments of pull boxes, pull box covers and protection of traffic signal poles and signs that fall within the proposed PCC ramp and sidewalk construction limits, unless otherwise called for on the plans. Since the adjustment of pull boxes and pull box covers may require lowering the pull box and pull box cover, said work shall also be considered to include the adjustment of conduit sweeps and conductors if they are found to encroach high enough into the new ramp finished surface plane. It is the Contractor's responsibility to review in the field in advance all existing pullboxes, which fall within the proposed ramp construction limits, to confirm whether the existing conduit sweeps and conductors will encroach into the proposed finished surface when the pullboxes are adjusted to grade and to bid accordingly.

The contractor shall schedule his operations in such a manner that the duration of time between demolition of curb and gutter, sidewalk and/or curb ramps and concrete placement shall not exceed 72 hours, which includes weekends. Sidewalk and curb ramps shall be opened to pedestrian access on the day following the concrete placement. In addition, all forms shall be

removed, irrigation systems shall be repaired, and backfilled placed within 72 hours following concrete placement at each of the curb and gutter reconstruction locations.

Concrete curb ramp construction shall include a 3-foot deep by 4-foot wide rectangular truncated dome mat per the latest Caltrans Standard Plan No. A88A and A88B. The truncated dome mat shall be “Federal yellow” in color for all applications.

A single panel cast-in-place truncated dome mat, constructed of Vitrified Polymer Composite (VPC) by Armor-Tile (800) 682-2525, www.armor-tile.com or approved equal, shall be required on all new curb ramps.

The truncated dome mat shall be installed across the entire width of the bottom of the curb ramp (typically 4-foot by 3-foot) and shall be installed per the manufacturer’s installation recommendations, and as directed by the Engineer. At a minimum the Contractor shall adhere to the truncated dome mat manufacturer’s installation requirements including proper surface preparation and protection of the work and surrounding area.

Where retaining curbs are required at the back of curb ramp / sidewalk to make up for a difference in elevation between the existing grade and proposed curb ramp / sidewalk grade, the construction of said retaining curb shall be considered as part of the curb ramp / sidewalk work.

All work necessary to construct the improvements shall be confined to City right-of-way. All excavation and forms necessary to construct the improvements shall not disrupt private property. In cases where improvements on private property need to be removed, prior approval from the Engineer or designee shall be obtained, and said improvements shall be replaced to its original condition to the satisfaction of the Engineer or designee. The contractor shall enter into a temporary agreement with the property owner to allow access for construction on private property, subject to City approval. Such agreement shall be provided to the City immediately after signatures are obtained. Costs, if any, for obtaining authorization shall be deemed as included in all other items of work and no additional compensation will be allowed.

Contractor shall ensure that the protection of all existing facilities, structures, and improvements on public and/or private property are maintained throughout the entire Project duration, including, but not limited to, the following: walls, driveways, decorative/colored concrete, stamped concrete, fencing, catch basins, curb and gutter, striping, signs, fire hydrants, landscaping, irrigation, concrete, and asphalt. Any damage to existing public and/or private facilities, structures, utilities, traffic signal loops, and improvements shall be repaired to the satisfaction of the Engineer by the Contractor at no cost to the City.

For the purpose of forming the new curbs and gutters, curb ramp, and cross gutter, a minimum of one-foot wide strip of asphalt concrete pavement shall be removed adjacent to the new curb and gutter, ramp, or cross gutter. The strip shall be replaced with a 12" full depth asphalt concrete as directed by the Engineer.

For the purpose of transitioning the new curbs and gutters, curb ramp, and cross gutter, a pavement transition may be required. The limits of removal shall be determined by the engineer. The pavement transition shall be replaced with a 12" full depth asphalt concrete as directed by the Engineer.

No open trench (forming strip or pavement digout) shall be left unattended at any time. All trenches shall be backfilled and paved or covered with steel traffic plates at the end of each working day.

In addition to concrete curb and gutter construction that is related to the concrete curb ramp construction; Concrete curb and gutter that is constructed in conjunction with the new curb ramps shall not be constructed monolithic with the adjacent curb ramp or sidewalk.

303-5.5 Finishing.

303-5.5.4 Gutter. [Add the following to this section]:
When the gutter is constructed, it shall be water tested. If any portion of the newly constructed gutter is shown to pond water, that portion, including curb if applicable, shall be removed, reconstructed and retested by the Contractor at no additional cost to the City. The exact limits of removal will be determined based on a survey conducted by Contractor, unless otherwise directed by the Engineer.

Payment for concrete sidewalk, which is related to the concrete curb ramp construction, within the curb ramp and curb return areas, and adjacent thereto shall be included in the various items of work bid and no additional compensation will be allowed therefore.

Retaining concrete curbs, which are required at the back of concrete curb ramps and sidewalks shall be included in the various items of work bid and no additional compensation will be allowed therefore.

Payment for asphalt concrete for forming or transitioning improvements shall be included in the various items of work bid and no additional compensation will be allowed therefore.

Adjacent asphalt concrete/aggregate base removal and replacement full depth asphalt concrete base course, associated with all concrete reconstruction work shall be included in the various items of work bid and no additional compensation will be allowed therefore.

Payment for Remove and Construct Curb & Gutter shall be included in the various items of work bid and no additional compensation will be allowed therefor.

SECTION 309 – MONUMENTS

309-1 Description. [Add the following to this section]:

All work shall be performed by a California licensed land surveyor or civil engineer qualified to perform survey work. The work shall consist of searching and locating existing centerline survey monuments; tie existing locations; coordinate removal with City Engineer; reset monuments upon completion of construction; prepare 8 ½” by 11” size tie sheets showing location of monuments and ties; and file with City Engineer. Monuments to be reset shall include all those found along centerline of streets within the Project boundary, all lot corner monuments disturbed by the construction shall be identified and protected or reset as necessary.

309-3 CONSTRUCTION. [Add the following]:
Prior to start of construction, the Contractor shall retain a California Licensed Land Surveyor to inventory all existing survey monuments and ties within the Project limits. The Contractor is

responsible for ensuring that all survey monuments and ties are restored. The Contractor shall file a Corner Record Form referencing survey monuments subject to disturbance in the Office of the County Surveyor. A copy of the filing shall be provided to the City prior to commencement of any work. The Contractor shall obtain prior approval from the Engineer before setting new survey monuments and shall do so meeting the standards of the City Engineer and County Surveyor. When a change is made in the finished elevation of the pavement of any roadway in which a permanent survey marker is located, the Contractor shall install a new survey monument to the new grade within seven (7) days of finished paving. The survey monument shall be installed to match the existing type destroyed. The Contractor will then reset ties and file a Corner Record Form in the Office of the County Surveyor.

309-4 PAYMENT [Replace with the following]:
Compensation for protecting, restoring and replacing survey monuments shall be included in the various items of work bid and no additional compensation will be allowed therefor.

SECTION 314 – TRAFFIC STRIPING, CURB AND PAVEMENT MARKINGS, AND PAVEMENT MARKERS

314-4.3 Painted Traffic Striping and Curb and Pavement Markings [Section 210 and Section 314 are replaced with the following]:

Removal and replacement of existing Traffic Striping, Pavement Markings, Signing, Delineators and Pavement Markers shall conform to the provisions in Section 82, "Signs and Markers", Section 82-9, "Roadside Signs", Section 84-2, "Traffic Stripes and Pavement Markings", and Section 81-3, "Pavement Markers", of the State of California, Department of Transportation's Standard Specifications, latest edition and the State of California, Department of Transportation's Standard Plans, latest edition (hereinafter referred to as the State Standard Specifications and the State Standard Plans, respectively), where applicable and these Special Provisions.

Roadside Signs

Roadside signs shall be installed at the locations shown on the plans or as directed by the ENGINEER, and shall conform to the provision in Section 82-9 "Roadside Signs," of the State Standard Specifications and these Special Provisions.

New signs shall be installed as indicated on the plans, on either existing street light standards or on new perforated steel tube posts with a break-away base, “Telespar” or equal.

Payment for installation of traffic roadside signs and posts shall be considered as included in various items of work and no additional compensation will be allowed therefore.

Paint Traffic Stripes and Pavement Markings.

Painting traffic stripes (traffic lanes) and pavement markings shall conform to the provisions in Section 84-1, "General," and 84-2, "Painted Traffic Stripes and Pavement Markings," of the State Standard Specifications and these Special Provisions.

The CONTRACTOR shall furnish the necessary control points for all striping and markings and shall be responsible for the completeness and accuracy thereof to the satisfaction of the ENGINEER.

The CONTRACTOR shall perform all layout, alignment, and spotting for traffic stripes and markings. Traffic striping shall not vary by more than ½ inch in 50 feet from the alignment shown on the plans. The dimensional details of the stripes and markings shall conform to the provisions set forth in the latest California Manual on Uniform Traffic Control Devices (CA MUTCD) and State Standard Plans available from Caltrans.

Spotting with cat tracks or dribble lines shall be performed prior to the removal of existing stripes. Cat tracks shall consist of spots of paint not more than 3 inches in width and not more than 5 feet apart along the alignment of the stripe. Paint for the cat tracks shall be the same as that for the intended stripe. Paint for the dribble lines shall be neutral color obtained by mixing approximately two parts white paint with one part black paint.

SPOTTING - Spotting shall be completed prior to the removal of any existing stripes or markings. Existing stripes and markings shall be removed prior to painting new ones, but in no case shall any section of street be left without the proper striping for more than 24 hours, or over weekends or holidays.

No striping or painting work shall start until the ENGINEER has specifically approved the spotted markings. Existing striping and markings, if any, shall be removed prior to painting new, but in no case shall any section of street be left without the proper striping for more than 24 hours, or over the weekends or holidays.

MATERIALS - Materials shall conform to the provisions in Section 84 - "Materials," of the State Standard Specifications and these Special Provisions. All traffic striping and pavement markings shall be two coats of paint with glass beads unless otherwise approved by the City Engineer. A minimum of 7 days and a maximum of 14 days shall elapse between application of the first and second coats of paint.

The paint for traffic striping and markings shall be as follows:

- High Performance Water Borne, Rapid Dry, White - PERVO Paint Co. #6000, or approved equal.
- High Performance Water Borne, Rapid Dry, Black - PERVO Paint Co. #6002, or approved equal.
- High Performance Water Borne, Rapid Dry, Yellow - PERVO Paint Co #6001, or approved equal.

All lines, legends, crosswalks, limit lines, and shapes shall be paint.
The paint for concrete curbs shall be the following, or an approved equal:

1. PERVO Paint Co. #6004 Red

All paint shall meet SCAQMD Rule 1113.
Glass beads shall conform to State Specification 8010-004.
All pavement markings shall match City stencils.

Measurement and Payment

Payment for Traffic Striping, Paint, Markers, and Markings shall be considered as included in the various items of work bid and no additional compensation will be allowed therefor.

PART 4 - EXISTING IMPROVEMENTS

SECTION 402 – UTILITIES

402 – 1 LOCATION
402-1.1 General. [Add the following]

The Contractor is advised of the existence of the utility notification service provided by UNDERGROUND SERVICE ALERT (USA). USA member utilities will provide the Contractor with the precise locations of their substructures in the construction area when the Contractor gives at least 48 hours notice to the Underground Service Alert by calling 1(800) 422-4133. Contractor shall provide the City with proof of contact with USA upon request.

The Contractor shall notify the following agencies at least 48 hours in advance of excavating around any of their structures or when implementing traffic control.

COMPANY
ATT Telephone
Frontier Cable
So CA Edison
So CA Gas
City of Lakewood Water Dept
Golden State Water Company
LA County PW Sewer Maintenance
EDCO Waste and Recycling
Long Beach Transit District
Orange County Transit Authority
Metropolitan Transit Authority
Los Angeles Sheriff's Department

The California Public Utilities Commission mandates that, in the interest of public safety, main line gas valves be maintained in a manner to be readily accessible and in good operating condition.

The Contractor shall exercise extreme care to protect all existing utilities in place whether shown on the plans or not, and shall assume full responsibility for all damage resulting from his operations. The Contractor shall coordinate with each utility company as to the requirements and methods for protection of their facilities during the construction period, and shall be responsible for preparation and processing of any required plans or permits. The Contractor shall assume full responsibility to maintain uninterrupted service for all utilities.

By submitting a bid, the Contractor acknowledges utility work may be done in conjunction with this Project. The Contractor shall schedule his work and conduct his operations so as to permit access and time for the required utility work to be accomplished during the progress of the work.

The Contractor shall coordinate with each utility company as to the extent of required work and the time required to do so. The Contractor shall include this time in his schedule. Payment for

the above, if any, shall be deemed as included in the items of work as shown on the Proposal bid sheet and no additional compensation will be allowed.

The existence and locations of utilities shown on the drawings have been determined by a search of the available records as provided by the respective utility owner. The exact locations have not been determined by potholing unless so indicated on the drawings. The Contractor shall determine the exact location of all existing utilities prior to commencing work. **Contractor agrees to be fully responsible for any and all damages which may be caused by his failure to exactly locate and preserve any and all underground utilities, whether shown on the plans or not**. In the event the Contractor encounters underground utilities not shown on the plans, he shall verify the exact location of the utility and immediately notify the Engineer, regardless of whether the unknown utility conflicts with the proposed construction or not. In the event of such a previously unknown conflict, the Contractor shall immediately notify the Engineer as to the extent, if any, of delays or additional costs resulting from said conflict. The Contractor shall perform work and provide necessary materials to disconnect or relocate existing utilities as indicated. Record on record drawings all existing utility termination points before disconnecting.

When uncharted or incorrectly charted underground piping or other utilities and services are encountered during site work operations, notify the applicable utility company immediately to obtain procedure directions. Cooperate with the applicable utility company in maintaining active services in operation.

In the event the Contractor damages an existing utility line, the Contractor shall restore damaged utilities within three (3) working days.

Pursuant to Government Code Section 4215, if any main or trunkline utility facilities that are not indicated in the drawings, plans or specifications and are determined by Contractor to be located on the site of any construction project that is a subject of the contract, the City shall assume the responsibility for timely removal, relocation, or protection of the existing main or trunkline utility facilities. The Contractor will be compensated for the costs of locating, repairing damage not due to the failure of the Contractor to exercise reasonable care, and removing or relocating such utility facilities not indicated in the plans and specifications with reasonable accuracy, and for equipment on the Project necessarily idled during such work. The Contractor will not be assessed liquidated damages for delay in completion of the Project when such delay was caused by the failure of City or the utility owner to provide for removal of relocation of such utility facilities. Nothing herein shall be deemed to require the City to indicate the presence of existing service laterals or appurtenances whenever the presence of such utilities on the site of the construction Project can be inferred from the presence of other visible facilities, such as buildings, meter and junction boxes, on or adjacent to the site of the construction; provided, however, nothing herein shall relieve the City from identifying main or trunklines in the plans or specifications. Nothing herein shall preclude the City from pursuing any appropriate remedy against the utility for delays which are responsibility of the utility. Nothing herein shall be construed to relieve the utility from any obligation as required either by law or contract to pay the cost of removal or relocation of existing utility facilities. If the Contractor, while performing the contract, discovers utility facilities not identified by the City in the Contract Plans or Specifications, Contractor shall immediately notify the Engineer and utility in writing. The public utility, whether they are the owner, has sole discretion to perform repairs or relocation work or permit the Contractor to do such repairs or relocation work at a reasonable price.

SECTION 403 MANHOLE ADJUSTMENT AND RECONSTRUCTION

403-1 GENERAL [Replace with the following]:
Sewer and storm drain manhole frames and covers shall be raised to the finished grade by the Contractor within 72 hours of final paving. The Contractor shall raise the tops of all frames and covers to range from flush to 1/4" above the finished grade of the immediately adjacent pavement. All manhole frames and covers adjusted to grade by Contractor shall be cleaned to the Utiliy Owner's satisfaction. Any surfaces utilities encountered that are not storm drain, sewer, or water shall be adjusted by the utility owners. If an adjustment is necessary, the Contractor shall notify utility owner at least forty-eight (48) hours prior in advance, of the need to commence work required prior to paving operations and again for work required after paving operations.

403-2 MANHOLES IN CONCRETE PAVEMENT. [Add the following to this section]:

Vaults with their top slab on grade shall be protected in place.

403-3 MANHOLES IN ASPHALT CONCRETE PAVEMENT [Replace with the following]

Adjustment of Sewer Manholes. Adjustments to grade of sewer manholes shall conform to the provisions of the Standard Plans of the City of Lakewood, as appropriate, and these Special Provisions. Manholes shall not be inaccessible for more than 5 working days. Prior to the start of work all manhole lids need to be masked off and covered. A false bottom system as described below shall be in place in all impacted manholes to assist the contractor with the collection and removal of all debris resulting from their work. The manholes to be adjusted shall have all existing mortar as well as the entire concrete frame/ring removed, a new ring or rings (however many may be necessary) set and ½-inch of new cement mortar and a new concrete frame placed. The joint between the new ring or rings and the existing manhole shall have an acceptable sealant applied on the inside to protect the integrity of the existing manhole liner from seepage. All work on manholes shall be done in accordance with the City of Lakewood standards. The pavement shall be replaced with an asphalt concrete structural section equivalent to that existing in adjacent areas.

The method of adjusting existing manholes in areas of new construction or reconstruction shall be as follows:

(1) Manhole frames and covers and manhole shafts shall be removed to a depth of six inches below subgrade and covered with an adequate steel cover.
(2) Upon completion of roadway construction, circular holes, no larger than 1' greater than the manhole, shall be cut where the manhole exists.
(3) The manholes shall then be raised to the proper grade, the manhole frames and covers replaced, and the pavement shall be replaced with an asphalt concrete structural section equivalent to that existing in adjacent areas.

If the manhole cover is unstable or noisy under traffic, said conditions shall be corrected by placing a coil of asphalt saturated rope, a plastic type washer or asphaltic compounds, as approved by the Engineer, on the cover seat.

For the false bottom system for sewer manhole frame adjustments, the Contractor shall exercise care so that surface materials such as rocks, dirt, and debris do not enter sewer lines. In order to prevent contamination, the Contractor shall be required to provide a ¾-inch thick plywood platform to be placed on the concrete shelf at the bottom of the manhole. The shape of this platform shall conform to the circumference of the inside wall at the shelf elevation. Contractor shall arrange for Engineer to inspect inside of all sewer manholes after plywood shelves have been installed, prior

to any work being done, including cold milling of street. After the manhole has been adjusted, the material accumulated on the plywood shelf, and plywood shelf shall be removed from the manhole in the presence of the Engineer, and disposed. In addition, prior to removal of the inserts, the Contractor shall contact the Engineer to verify that all debris has been removed from the sewer system.

Adjustment of Storm Drain Manholes.

Adjustments to grade of storm drain manholes shall conform to the provisions of the Standard Plans of Public Works Construction and these Special Provisions. The method of adjusting existing manholes in areas of new construction or reconstruction shall be as follows:

(1) Manhole frames and covers and manhole shafts shall be removed to a depth of six inches below subgrade and covered with an adequate steel cover.
(2) Upon completion of roadway construction, circular holes, no larger than 1' greater than the manhole, shall be cut where the manhole exists.
(3) The manholes shall then be raised to the proper grade, the manhole frames and covers replaced, and the pavement shall be replaced with an asphalt concrete structural section equivalent to that existing in adjacent areas.

If the manhole cover is unstable or noisy under traffic, said conditions shall be corrected by placing a coil of asphalt saturated rope, a plastic type washer or asphaltic compounds, as approved by the Engineer, on the cover seat.

403-5 PAYMENT [Replace with the following]:

Payment for **Adjust Sewer Manhole to Grade** and/or payment for **Adjust Storm Drain Manhole to Grade** shall be paid at the unit price bid for for various items of work bid and no additional compensation will be allowed therefore.

SECTION 404 – COLD MILLING.

404-1 GENERAL. [Add the following]:
Cold milling will not be considered complete until all loosened material is removed from the Project site. The contractor shall schedule his operations in such a manner that the duration of time between cold milling and asphalt placement shall not exceed 48 hours, which includes weekends.

Cold milled streets shall be approved by the Engineer as completed for cold milling prior to paving. Sweepers used for cold mill sweeping shall not enter on streets approved as completed for cold milling.

404-2 MILLING MACHINE.
404-2.5 Method. [Add new Subsection]:
The surface tolerance produced by Cold Milling shall be such that a 10 feet straight edge laid laterally will indicate variances of less than 3/8" (except in crown area) and a 10 feet straight edge laid longitudinally will indicate variances of less than 3/16".

At the end of each day's paving, all vertical transverse construction joints shall be filled with cold mix asphalt concrete for a minimum horizontal distance, in direction of traffic, of five (5) feet or as necessary to insure the surface grade changes do not exceed 3%. The intent is to provide a smooth transition for vehicular traffic. This transition shall be properly and continuously

maintained until the final asphalt concrete course is placed. Temporary A.C. wedges will then be removed no sooner than 24 hours prior to paving. The temporary pavement shall be absorbed into the unit costs for cold milling and no additional compensation will be allowed.

It is Contractor's responsibility to construct the A.C. surface course within two (2) days after the cold milling work is complete.

404-7 WORK SITE MAINTENANCE. [Add the following]:
Residue from grinding shall not be permitted to flow or travel into gutters, onto adjacent street surfaces or parkways. Contractor shall remove all gravel and dust from adjacent sidewalks and driveways to the satisfaction of the Engineer. All residues shall be completely removed by a vacuum sweeper and properly disposed. Sweeping is to take place immediately after the grinding has been completed and as directed by the Engineer. No washing of any residue into gutters and/or drainage structures shall be allowed. The Contractor shall cover and protect all storm drain inlets prior to the start of cold milling operations.

404-8 DISPOSAL OF MILLINGS. [Add the following]:
No washing of any residue into gutters and/or drainage structures shall be allowed. The Contractor shall be required to place water permeable fabric secured by gravel bags across the openings of all catch basin openings prior to beginning the milling operations and conform to other related water quality procedures / requirements.

404-10 PAVEMENT TRANSITIONS. [Add the following]:
The Contractor shall provide access and detours at all times for pedestrian facilities and bike lanes when cold milling. Temporary asphalt concrete shall be placed and maintained at the interface between milled and non-milled areas to eliminate the hazard caused by sudden elevation differences, especially in pedestrian path of travel areas adjacent to wheelchair ramps, and shall be removed prior to placement of surface course pavement.

404-12 PAYMENT. [Add the following]:
Payment for Cold Milling shall be considered included in the various items of work bid and no additional compensation will be allowed therefore.

PART 6 - TEMPORARY TRAFFIC CONTROL

SECTION 600 ACCESS

600-2 VEHICULAR ACCESS [Add the following]
When entering or leaving roadways carrying public traffic, the Contractor's equipment, whether empty or loaded, shall in all cases yield to public traffic.

The Contractor shall notify in writing all affected property owners of the proposed construction schedule a minimum of forty-eight (48) hours, but not more than seventy-two (72) hours, in advance of any limitation or closure of access to their property. Form of said notice shall be as approved by the Engineer and shall contain the date and time of the closure. In the event of delay, whether beyond the control of the Contractor or not, the Contractor shall notify all affected property owners as to the extent of the delay and his revised schedule. In the event of delay over 72 hours, the Contractor shall re-notify the property owners as described above. Payment for notification and coordination shall be included in the compensation paid for the various items of work and no additional compensation will be allowed. The "Notices" will be furnished by the Contractor.

The Contractor is advised as to the possibility of other construction projects within the proposed construction zone by the City, other governing agencies or private enterprises. In the event of such projects, the Contractor shall coordinate with the applicable parties as to the extent of any time required to complete their work and shall schedule its work and conduct its operations so as to permit access and time as required for the concurrent work. The Contractor shall immediately notify the City Engineer in the event of a delay in scheduling caused solely by this concurrent work. Payment for the above, if any, shall be deemed as included in the items of work as shown on the Proposal bid sheet and no additional compensation will be allowed.

600-3 PEDESTRIAN ACCESS [Add the following]
Pedestrian access shall be maintained at all times during construction and shall be in accordance with the Americans With Disabilities Act.

SECTION 601 – TEMPORARY TRAFFIC CONTROL FOR CONSTRUCTION AND MAINTENANCE WORK ZONES

601-2 Temporary Traffic Control Plan (TCP)
601-2.1 General [Add the following]:

The Contractor shall provide delineation in accordance with the latest updated version of the California Manual on Uniform Traffic Control Devices (MUTCD). The Contractor shall schedule the order of his work such that no travel lanes are closed before 9:00 A.M. or after 3:30 P.M. daily. A minimum of one through travel lane and all turning lanes in all directions shall be maintained during construction between 9:00 A.M. and 3:30 P.M. The same number of travel lanes currently in use (at the time of bid) shall be opened to traffic each and every day between 3:30 P.M. and 9:00 A.M. No work that interferes with public traffic shall be performed after 3:30 P.M. or before 9:00 A.M. No street closures shall be made. The traffic signal and traffic signal detectors shall remain operational during the construction until their replacement is scheduled within 5 days of disruption. Night work shall only be allowed with approved, written approval by the City Engineer, at the contractor's request, and shall be completed at no additional cost if approved.

Separation between travel lanes shall be accomplished by the use of delineators placed at a maximum of 15' on center. Traffic channelization at intersections shall be accomplished by the use of delineators placed at a maximum of 10' on center.

It shall be the Contractor's responsibility to furnish a detailed traffic control plan prepared and stamped/signed by a licensed civil or traffic engineer licensed in the State of California for City approval. Detours shall be in accordance with Caltrans standards. The Contractor shall submit detailed drawings of any proposed detour(s)/lane closures to the City Engineer for approval prior to the commencement of work. The traffic control plans shall be submitted to the City for review and approval within 10 working days after the date of the Notice of Award.

601-2.2 Payment [Replace with the following]
Compensation for the preparation of the TCP shall be paid for in various items of work and no additional compensation will be allowed therefor.

601-7 Street Closures, Detours, Barricades. [Add the following new Subsection]:

601-7.1 General

The Contractor shall perform lane closures and all traffic control operations in accordance with the applicable details in the California MUTCD, latest edition. No work shall be performed until the required lane closure traffic control has been installed and approved by the City. If the City determines the Contractor has failed to properly and safely implement the MUTCD details, then work shall be stopped until such time as the Contractor can successfully remedy the deficiencies.

Portable delineators (traffic cones are not allowed), which conform to the California MUTCD, latest edition, shall be spaced as necessary for proper delineation of the travel way. The spacing between delineators shall not exceed 25 feet. The minimum lane transitions shall be a 50 to 1 taper. Double base delineators will be required.

The Contractor shall schedule the order of his work such that no travel lanes are closed before 9:00 A.M. or after 3:30 P.M. daily. A minimum of one through travel lane and all turning lanes in all directions with flaggers will be required at all times. The same number of travel lanes currently in use shall be opened to traffic during non-working hours. No street closures shall be made unless indicated on the approved traffic control plans. The traffic signal and traffic signal detectors shall remain operational continuously during the construction, and traffic loops that require replacement shall be disrupted no more than five (5) calendar days before their replacement. No weekend work (day or night) will be allowed, unless otherwise specified on the Plans or as approved by the City.

The Contractor shall provide, at his expense, advanced warning signs advising the public of the impending major construction project and his proposed schedule. Said signs shall be posted at all major approaches to the construction zones a minimum of one week prior to the start of construction. The Contractor shall designate at least one worker solely for the provision and maintenance of traffic control.

The Contractor shall be responsible for providing temporary access to all intersecting streets and driveways throughout the workday and at the end of each workday. A minimum of one access point shall be maintained for each commercial business during their normal business hours. Pedestrian access shall be maintained at all times and temporary and permanent pedestrian access shall be in accordance with the Americans with Disabilities Act.

The Contractor shall provide and maintain all other signs, barricades, pedestals, flashers, delineators and other necessary facilities for the protection of the public within the limits of the construction area and shall be maintained in a new or like new condition, free of damage and graffiti. If the traffic delineators are damaged, displaced or not in an upright position, from any cause, said delineators shall immediately be replaced or restored to their original location, in an upright position, by the Contractor.

The Contractor shall furnish competent trained flag persons to give adequate warning to traffic or to the public of any dangerous conditions to be encountered. Flag persons, while on duty and assigned to give warnings to the public that the highway is under construction and of any dangerous conditions to be encountered as a result thereof, shall perform their duties and shall be provided with the necessary equipment in accordance with the California MUTCD. The equipment shall be furnished and kept clean and in good repair by the Contractor, at Contractor’s expense.

Should the Contractor appear to be neglectful or negligent in furnishing warning and protective measures as provided, the Engineer may direct attention to the existence of a hazard and the

necessary warning and protective measures shall be furnished and installed by the Contractor at its own expense. Should the Engineer point out the inadequacy of warning and protective measures, such action on the part of the Engineer shall not relieve the Contractor from responsibility for public safety or abrogate his obligation to furnish and pay for these devices.

Where on-street parking is allowed, the Contractor shall be required to post "Temporary No Parking" signs at least seventy-two 72 hours prior to start of work. The Contractor will furnish the notification to property owners and the “Temporary No Parking” signs.

No construction activities will be allowed on streets that are receiving trash pick-up services on the same day. A copy of the Edco Waste Collection Map is available on the City’s website. The Contractor shall coordinate with the trash hauler in preparing the construction schedule. The Contractor shall provide a map showing the schedule of the work, which should coordinate with the trash and mail schedule, to the City at the preconstruction meeting.

Contractor shall notify the following entities at least seventy-two (72) hours in advance of any street closure or restriction to access.

1. Fire: Los Angeles County Fire Department:
    a. Station 34 - 21207 S. Norwalk (East)- 562-865-4119
    b. Station 45 - 4020 E. Candlewood (Northwest) - 562-634-1235
    c. Station 94 - 6421 Turnergrove (Central) - 562-429-9462
    d. Station 122 - 2600 Greenmeadow (Southwest) - 562-421-7713
2. Police: Los Angeles County Sheriff’s Department, Lakewood Substation, 562-623-3500
3. School District: ABC Unified School District: 562-926-5566
4. Trash: EDCO Waste and Recyling: 562-531-3054
5. Street Sweeping: City of Lakewood: 562-866-9771
6. Transit: Orange County Transportation Authority (OCTA), 714-560-6282
    Long Beach Transit District, 562-591-8753
    Los Angeles Metropolitan Transit, 213-922-6000
8. Mail: US Postal Service, Lakewood Post Office, 800-275-8777

The City Engineer may add additional entities to this list at their discretion.

All existing stop signs, street name signs and regulatory signs shall be maintained in visible locations during construction. Where construction detours and signing conflict with existing signing, the Contractor shall cover existing signs in a manner approved by the City. The Contractor shall also provide temporary traffic restriping, or reflective white or yellow plastic tabs, at the conclusion of each working day, if not sooner, as directed by the City, for any centerline, painted median or lane line that is obliterated by construction.

The Contractor shall provide temporary delineation as directed/approved. Temporary delineation shall include sandblasting of conflicting markings; installation and removal of temporary centerlines or lane lines, detour signing, barricading; and replacement of traffic lines and markings in their proper locations upon termination of the detour. Conflicting existing and temporary striping, as required for traffic control during construction, shall be removed by the Contractor by using wet nozzle sandblasting methods with immediate clean up of residues.

Blacking-out of the pavement striping will not be allowed. Temporary reflective striping tape or reflective plastic tabs may be used, except that it shall not be applied to final asphalt surfaces.

Said tape or tabs shall be removed from temporary surfaces prior to placement of additional asphalt.

The Contractor shall also be responsible for notifying adjacent businesses, residents (of affected residential tracts), and entities listed above, in writing seven (7) days in advance of any work that involves limited access. Said notice shall be reviewed and approved by the City in advance of its circulation. Contractor shall provide verification to the City that proper circulation of the notice has been accomplished.

The Contractor shall maintain a 24-hour emergency service to remove, install, relocate, and maintain warning devices. No later than 10 days after the award of the Contract, the Contractor shall furnish to the City, names, and telephone numbers of three persons responsible for this emergency service. In the event these persons do not promptly respond when notified, or it becomes necessary to call other forces to accomplish emergency service, the Contractor will be responsible for any cost incurred.

Prior to the start of each work day, the Contractor shall perform all necessary work incidental to and commensurate with the proper signing, detouring, barricading, etc., heretofore and hereinafter specified that is required for that particular day's schedule of operations. No construction shall be permitted until such signing and detouring operations have been completed and approved by the City.

Personal vehicles of the Contractor's employees shall only be parked in an allowed area as delineated by the City, and shall not be parked on the traveled way at any time, including any section closed to public traffic.

Flashing Arrow Signs:

Each flashing arrow sign shall be solar powered, mounted on a truck or on a trailer and shall be capable of operating while the vehicle is moving or as directed by the City.

Signs mounted on the cab of a truck shall be mounted to provide a minimum of 7 feet between the bottom of the sign and the roadway. Signs mounted on a trailer, or on anything other than the cab of a truck, shall be mounted to provide a minimum of 8 feet between the bottom of the sign and the roadway.

The total weight of trailer mounted flashing arrow sign including the trailer, sign, power source and other components shall not exceed 1,500 pounds and the height of the level trailer bed shall be no higher than 21 inches above the roadway. The trailer shall be equipped with a minimum of 3 leveling jacks.

Alternative types of lamps may be used in flashing arrow signs if visibility is equal to the specified lamps. Each type AX flashing arrow sign shall be a minimum of 2 feet high and 4 feet wide, and shall be finished with flat black enamel. A minimum of 13 No.4414AX 12-volt, yellow or amber lamps shall be installed in the panel. The lamp configuration shall be for 3 arrowheads or an arrow shaft with 2 arrowheads, one pointing in each direction on the face of the sign with a minimum of 5 lamps forming each arrowhead. Each lamp shall be provided with a visor.

The lamp shall be activated by a switch on a control panel and shall be controlled by electronic circuitry to provide a minimum of 4 selectable modes of operation as follows:

1. Pass Left Mode, - Sequencing of lighted arrowheads or sequencing the lamps forming the arrow shaft and arrowhead to the left or a flashing left arrow with the lamps in the arrow shaft and arrowhead flashing on and off simultaneously.

2. Pass Right Mode, - Sequencing of lighted arrowheads or sequencing the lamps forming the arrow shaft and arrowhead to the right or a flashing right arrow with the lamps in the arrow shaft and arrowhead flashing on and off simultaneously.

3. Simultaneous Mode, - Either the outside arrowheads pointing in opposite directions are continuously illuminated, except for the center lamp forming each arrowhead, while the arrow shaft lamps flash on and off simultaneously or the outside arrowhead pointing in opposite directions and the arrow shaft lamps all flash simultaneously to indicate passing on either side.

4. Travel Mode, - Travel or caution mode shall flash in a manner not resembling any other mode.

Lane Requirements:
There shall be a minimum of 5’ clearance from open excavations and two feet from other obstructions (curbs, k-rail, etc). All lanes shall be open to traffic during non-working hours.

The Contractor shall be required to use flashing arrow signs at all lane closures to direct travel and appropriate detour signing to control traffic through and/or around the construction area.

The Contractor will not be allowed to excavate a larger quantity of area (“digouts”) than can successfully be repaved in the same working day. No incomplete paving work will be allowed to remain during the hours designated as requiring “all” lanes open to traffic, except in specific instances in which a minor amount of area can safely be covered by approved means with non-skid steel plates, capable of carrying H-20 wheel loading, or patched with temporary AC to bring the excavation up to grade. Said temporary AC shall be ground down to permanent AC sub-grades and approved by the City prior to placement of any additional permanent AC.

Excavations of less than 4’ in width may be covered with non-skid steel plates capable of carrying H-20 wheel loading over the span of the excavation. Plates shall have a minimum width equal to the excavation width plus 24 inches and be securely fastened to the street surface. Asphalt fillers, a minimum of 6 inches wide shall be placed around the perimeter of the plate. When traffic is transferred to any type of temporary pavement surface good drivability of the surfaces shall be maintained and shall be subject to approval by the City prior to allowing traffic to be transferred upon it.

The Contractor shall also ensure that access to all side streets and driveways are maintained at all times. Work in front of or within driveways and side streets shall be conducted in a manner where at no time is access to property denied. Portions of driveway approaches that are not ready to be opened for traffic at the end of the workday shall be steel plated per the requirements noted in the previous paragraph. The Contractor shall use temporary AC surfacing at his own expense for traffic control as required to maintain traffic in a safe non-disruptive manner.

601-7.2 Payment [Add the following new Subsection]:
Payment for Traffic Control, Street Closures, Detours and be included in various other items of work as bid and no additional compensation will be allowed therefore.

DRAFT TECHNICAL PROVISIONS

Titles and Certifications

CIVIL ENGINEER

Kier + Wright
163 Technology Drive, Suite 150
Irvine, CA 92618

California Licensed Engineer:
David G. Readler
Registration #76867

ARCHITECT

Dahlin Group
505 Technology Drive, Suite 200
Irvine, CA 92618

California Licensed Engineer:
[Insert Name Here]
Registration #00000

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STRUCTURAL ENGINEER

DCI Engineers
2600 Michaelson Drive, Suite 930
Irvine, CA 92612

California Licensed Engineer:
Maggie Carlson
Registration #S6164

MECHANICAL, PLUMBING ENGINEER

Pocock Design Solutions, Inc.
14451 Chambers Road, Suite 210
Tustin, CA 92780

California Licensed Engineer:
Andrew R. Gossman
Registration #M35839

ELECTRICAL ENGINEER

FBA Engineering
150 Paularino Avenue, Suite A120
Costa Mesa, CA 92626

California Licensed Engineer:
Stephen R. Zajicek
Registration #10372

LANDSCAPE ARCHITECT

Verde Design
3685 Main Street, Suite 350
Riverside, CA 92501

California Licensed Engineer:
Mark S. Baginski
Registration #4089

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E2.0	ELECTRICAL DEMOLITION PLAN
E2.1	LIGHTING PLAN
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E4.1	TITLE 24 CALCULATIONS
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07 LANDSCAPE – VERDE DESIGN

D1	IRRIGATION PLAN
D2	IRRIGATION AND PLANTING DETAILS
L2.1	PLANTING PLAN
L3.1	IRRIGATION PLAN

END OF SECTION

SECTION 01 10 00

SUMMARY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Contract description.
2. Work by Owner.
3. Contractor use of site.
4. Owner occupancy.
5. Specifications conventions.
6. Existing Conditions Information.

1.2 CONTRACT DESCRIPTION

A. Project Work Includes:
1. The Work of the Project is defined by the Contract Documents and consists of the construction as shown on Contract document prepared by DAHLIN, which consist of a full-building renovation project of an existing one-story community center facility including a 1,289 SF addition. The renovation includes the interior and exterior of the building. Total area 14,600 sf.
2. Project includes all labor materials and management required for the demolition and renovation of the existing Palms Park Community Center. See project documents for detailed descriptions of project work, code requirements, occupancy classifications and construction type, and other Work indicated in the Contract Documents.
3. Refer to Project Manual Table of Contents, Specifications Divisions 2 thru 49 for listing of complete Work included.

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B. Project Delivery Method: General Construction.

1.3 WORK BY OWNER

A. Separate contracts include:
1. Bee removal.
2. Interior Furnishings: Owner will retain commercial furnishing vendor to install all new furnishings within project. General Contractor is responsible for the removal of any / all existing furnishings from project at start of project / turn-over of site to General Contractor.

B. Items noted NIC - Not in Contract - will be furnished and installed by Owner.

C. Owner will remove the following before construction starts.
1. Items noted in the drawings as "Remove and store".

D. Coordinate Owner work to ensure efficient construction operations.

1.4 CONTRACTOR USE OF SITE

A. Limit use of site and existing facilities to areas shown on Drawings.

B. Plan construction operations to accommodate:
   1. Owner construction and safety regulations.
   2. Emergency egress.
   3. Work by Owner.
   4. First responder access to public right-of-way and site.

C. Prohibit smokeless tobacco, smoking, and vaping within buildings and within 25 feet of building exterior.
   1. Prohibited activities are permitted within designated areas only.

D. Prohibit controlled substances on site.

E. Existing Building Restrictions:
   1. On-Site Work Hours: Owner directed.
   2. Utility Interruptions: Give Owner minimum 72 hour notice. Obtain Owner written permission.
   3. Disruptive Operations: Give Owner minimum 72 hour notice before starting noisy, vibration causing, odorous, and other occupant disruptive operations. Obtain Owner written permission before proceeding.
   4. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping designated as “existing and to remain” affected by construction operations throughout the construction period. Repair damage caused by construction operations.

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F. Contractor to provide logistics plan that includes, but not limited to, laydown area, storage containers, parking, temp fencing, office trailers, delivery point.

G. Comply with limitations on use of public streets and with other requirements of Authorities Having Jurisdiction.

1.5 OWNER OCCUPANCY

A. Owner will vacate construction area before construction starts.

1.6 SPECIFICATION CONVENTIONS

A. Specifications are written in imperative mood and streamlined form.
   1. Imperative sentences are Contractor requirements.
   2. Colons mean “shall be” in streamlined form sentences and phrases.

1.7 EXISTING CONDITIONS INFORMATION

A. Existing Conditions Drawings and Specifications:
   1. See Section 003119.

B. Existing Hazardous Materials Information:
   1. See Section 003126 and Appendix A at the end of this manual.

C. Geotechnical Information:
   1. See Section 003132 and Appendix B at the end of this manual.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 20 00

PRICE AND PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Substitution procedures.
2. Contract modification procedures.
3. Schedule of values.
4. Progress payment procedures.
5. Final payment procedures.

1.2 ACTION SUBMITTALS

A. Allowance Submittals:
1. Supplier proposals.
2. Selected product purchase agreements.
3. Missing and damaged product claims.

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B. Schedule of Values.

C. Applications for Payment.
1. Updated construction schedule.
2. Waivers.
3. Substantiating data.
4. Progress executive summary.
5. Time and material documentation.

D. Change Order Proposals.

E. Change Order Proposal Request Response:
1. Contractor estimate.

1.3 INFORMATIONAL SUBMITTALS

A. Transportation damage claims.

B. Name of individual authorized to receive change orders.

1.4 SUBSTITUTION PROCEDURES

A. Substitution Request Time Limits During Bidding: See Instructions to Bidders.

B. Substitution Request Time Limits After Bidding:
   1. Within 30 days after start date established in Notice to Proceed.
   2. Within 30 days after date of Agreement.
   3. Substitutions may be considered when products become unavailable beyond Contractor control.

C. Submitting substitution request represents that Contractor:
   1. Has investigated and determined proposed product meets or exceeds specified requirements and quality.
   2. Will provide specified warranty for proposed product.
   3. Will coordinate installation and adjust Work to accommodate proposed product at no additional cost to Owner.
   4. Waives claims for additional costs and time extensions discovered after proposed product acceptance.
   5. Will reimburse Owner and Architect for review and redesign services required for re-approval by authority having jurisdiction.
   6. Requested substitution is fully compatible with other portions of the Work.

D. Substitution requests will not be considered:
   1. When stated or implied on submittals, without separate written request.
   2. When acceptance will require Contract Document revisions.
   3. Without meaningful Contract Sum or Contract time net reduction.
   4. When request source is not Contractor.
   5. When not consistent with contract documents.

E. Conditions for Consideration:
   1. Substitutions for Cause: Considered when:
      a. Specified product is unavailable.
      b. Specified product is not acceptable to authorities having jurisdiction.
      c. Use of specified product would delay progress of the Work.
      d. Contractor can provide significant cost or time savings.
   2. Substitutions for Contractor Convenience: Will not be considered.

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F. Substitution Submittal Procedure:
   1. Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittal.
   2. Complete separate substitution request using Architect accepted form for each proposed substitution.
   3. Indicate Contract Sum and Contract time net reduction, if proposed substitution is accepted.
   4. Substantiate substitution requests with data confirming that proposed substitution complies with Contract Documents.
      a. Compare specified product requirements in tabular form against proposed substitution.
      b. Submit Shop Drawings, Product Data, Samples, and certified test results attesting to the proposed product equivalence.
   5. Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
      a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
      b. Substitution request is fully documented and properly submitted.
      c. Requested substitution will not adversely affect Contractor's construction schedule.

d. Requested substitution has received necessary approvals of authorities having jurisdiction.
e. Requested substitution is compatible with other portions of the Work.
f. Requested substitution has been coordinated with other portions of the Work.
g. Requested substitution provides specified warranty.
h. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

6. Architect will notify Contractor and Owner of estimated time and costs to evaluate proposed substitution.
   a. Contractor will notify Architect to proceed with review or not.
   b. Contractor agrees to reimburse Architect for actual time and costs to complete review.
7. Architect will notify Contractor of substitution request acceptance or rejection.
8. Architect will consider one substitution request for each product. When request is rejected, provide specified product.

1.5 CONTRACT MODIFICATION PROCEDURES

A. Receive and distribute change documents informing others affected by changes to the Work.

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B. Architect will issue supplemental instructions for minor changes in Work without adjustment to Contract Sum and Contract Time. Execute supplemental instructions when received.
   1. Architect Supplemental Instruction Form: AIA Form G710.

C. Change Proposal Requests: The Construction Manager may issue Proposal Requests for Owner directed changes. Prepare and submit response within five days. Proposal response may include:
   1. Detailed description of proposed change.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
      b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
      c. Include costs of labor and supervision directly attributable to the change.
   2. Drawings and specifications.
   3. Change in Contract Time for executing change.
   4. Required overtime work.
   5. Time period proposed price is considered valid.

D. Change Order Proposals: Contractor may propose changes to Architect. Prepare proposal request including:
   1. Rationale for proposed change.
   2. Detailed description of proposed change and effect on Work.
      a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.

b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.

3. Substitution documentation.
4. Effect on Contract Sum and Contract Time.
5. Effect on Work by separate contracts.

E. Stipulated Sum Change Order Basis:
1. Architect Proposal Request and Contractor fixed price estimate.
2. Contractor request for Change Order as approved by Owner.

F. Construction Change Directive: Construction manager may issue directive, signed by Owner, describing changes in work and designating method of determining Contract Sum and Contract Time changes. Execute change directive Work when received while Change Order is processed.
1. Construction Change Directive Form: AIA Form G714.

G. Time and Material Change Order: Submit itemized account and supporting data for each change. Construction Manager will determine allowable Contract Sum and Contract Time Changes.
1. Provide information required for change evaluation.
2. Maintain detailed labor and material work records.
3. Maintain detailed records on a time and material basis of work required by the Construction Change Directive. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

H. Change Order Execution: Construction manager will issue Change Orders for Owner and Contractor signatures.
1. Change Order Form: AIA G701 or AIA G701CMa.

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I. Contractor Coordination:
1. Record each executed Change Order as separate line item on Schedule of Values and Application for Payment forms. Adjust total Contract Sum.
2. Revise progress schedules to reflect changes in each executed Change Order.
3. Record changes in Project Record Documents.

1.6 SCHEDULE OF VALUES

A. Submit completed schedule of values.
1. Schedule of Values Form: AIA Form G703 or Architect accepted form.

B. Submit Schedule of Values within 15 days after Notice to Proceed.

C. Format: Use Project Manual Table of Contents. Identify line items by specification section number and title.

D. Include Contractor overhead and profit and separate line items for:
1. Site mobilization.
2. Site demobilization.
3. Bonds and insurance.

E. Revise Schedule of Values showing each approved Change Order.

1.7 PROGRESS PAYMENT PROCEDURES

A. Submit completed applications for payment with updated construction schedule and substantiating data.
   1. Payment Application Form: AIA Forms G732 and G736.

B. Content and Format: Schedule of Values.

C. Substantiating Data:
   1. Partial release of liens from major subcontractors and vendors.
   2. Affidavits attesting to offsite stored products.

D. Substantiating Data:
   1. Partial release of liens from major subcontractors and vendors.
   2. Affidavits attesting to offsite stored products.
   3. Certified payroll reports for Contractor and subcontractors.

E. Executive Summary: Highlight progress since previous Application for Payment.
   1. Include summary bar chart construction schedule, construction photographs, and other pertinent information for distribution to Board of Trustees.
   2. Coordinate summary content with Owner.

1.8 FINAL PAYMENT PROCEDURES

A. Submit final application for payment with substantiating data.
   1. Payment Application Form: AIA Forms G702 and G703 or Architect accepted form.

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B. Content and Format: Schedule of Values.

C. Substantiating Data:
   1. Final certified Contractor and Subcontractor payroll reports.
   2. Final utility meter readings, fuel levels, and other data for utilities when Substantial Completion occurred.
   3. Final statement accounting for all changes to the Contract Sum.
   4. Certified completion of punch list.
   5. Proof of payment of taxes, fees, and other obligations.
   6. Insurance certificates.
   7. Contractor Affidavit of Payment: AIA Form G706 or Architect accepted form.
   8. Contractor Affidavit of Release of Liens: AIA Form G706A or Architect accepted form.
   9. Consent of Surety to Final Payment: AIA Form G707 or Architect accepted form.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Coordination and project conditions.
2. Coordination documents.
3. Coordination modeling.
4. Preconstruction meeting.
5. Site mobilization meeting.
6. Progress meetings.
7. Coordination meetings.
8. Preinstallation meetings.
9. Requests for Interpretation or Information, RFIs.
10. Project management website.

1.2 INFORMATIONAL SUBMITTALS

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A. Coordination documents.
1. Initial completed documents.
2. Revisions, when completed.

B. Contractor Staff: In addition to Project manager, superintendent, safety officer, provide other administrative and supervisory personnel as required for proper performance of the Work.

C. Contractor is solely responsible for construction means, methods, techniques, sequences, and procedures for performing Work.

D. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1.3 COORDINATION DRAWINGS

A. Prepare coordination drawings to organize installation of kitchen, mechanical, plumbing, fire protection, and electrical quipment and systems for using space efficiently, sequencing installation, and identifying potential conflicts and interferences.

B. Show systems for each area on one drawing. Indicate systems showing actual sizes, locations, and elevations.

C. Show clearances between systems and where systems cross structural framing.

D. Identify electrical power characteristics and control wiring required for equipment.

E. Revise drawings to eliminate conflicts preventing completion of Work.

F. Require each installer with work shown on coordination drawings to sign drawings indicating acceptance of coordinated work locations.

G. Maintain documents for the duration of the Work. Record changes during progress of Work.

H. Reproduce and distribute coordination documents to affected Parties.

1.4 COORDINATION MODELING

A. Prepare clash detection coordination model using coordination or shop drawings required in individual Specification sections.
   1. Coordination modeling does not absolve Contractor of due diligence to the accuracy and quality of the Work installed.
   2. Sequence: Submit Shop Drawings for review before start of coordination modeling. Should submittals be returned revise and resubmit, modeling may occur simultaneously with review period when scheduling is a concern. Reviewer is not responsible for any rework that may be required to correct work done for coordination purposes.
      a. Where conflicts occur, propose alternative solutions for Architect and Owner review at coordination meetings.
   3. Content: Model to a sufficient level of development to show and resolve conflicts. Architect will confirm model is sufficient in scope or detail. Show the following, where applicable:
      a. Slab Edges and Embedded Items: Locations and sizes for metal fabrications, sleeves, anchor bolts, bearing plates, angles, floor finishes slab depressions, curbs, and housekeeping pads.
      b. Structural penetrations and openings.
      c. Plenum Spaces: Subframing and kickers for ceiling and wall supports, mechanical equipment, electrical wiring and fixtures, and piping.
      d. Visible ceiling-mounted devices.
      e. Building Service Rooms: Plumbing, fire protection, electrical, and mechanical equipment.
      f. Plumbing and Mechanical:
         1) Elevations and sizes of ductwork and piping. Include insulation, bracing, flanges, and support systems.
         2) Major Components: Dampers, valves, diffusers, access doors, and cleanouts.
         3) Fire-rated enclosures.
      g. Fire Protection: Standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
      h. Electrical:
         1) Vertical and horizontal conduit 1-1/4 inches in diameter and larger.
         2) Light fixtures, emergency battery packs, smoke detectors, and other fire alarm locations.
         3) Panelboards, switchboards, switchgear, transformers, busway, generators, and motor control centers.
         4) Pull boxes and junction boxes.
         5) Electrical door hardware devices.

B. Format: Autodesk Navisworks. Comparable format is acceptable provided Contractor and applicable Trade Partners have access to the same software.
   1. Perform three-dimensional component conflict analysis as part of coordination efforts.

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C. One set of digital data files of drawings will be provided for use in preparing coordination models.
   1. Architect makes no representations as to the accuracy or completeness of digital data files.
   2. Digital Drawing Software Program: The Contract Drawings are available in Revit or AutoCAD.
   3. Contractor, Subcontractors, and other parties granted access by Contractor will execute a data licensing agreement. Contact Architect for electronic file usage agreement.
   4. Contractor may not utilize or return Architect's drawings to Architect for review as a shop drawings or other form of coordination drawing required from Contractor. Any direct use of Architect's drawings will be rejected and returned without action.
   5. Subcontractors and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement acceptable to Owner and Architect.
   6. The following digital data files will be furnished for each appropriate discipline as general information without the inclusion of text and tags, dimensions, or other annotations:
      a. Floor plans.
      b. Reflected ceiling plans.
      c. Roof plans.
      d. Exterior elevations.
      e. Building sections.
   7. Architect's project borders, sheet formatting, general notes, and details will not be provided for Contractor's uses.
   8. Follow the protocols and provisions established in the Agreement by AIA E203, Building Information Modeling and Digital Data Exhibit.

1.5 PRECONSTRUCTION AND MOBILIZATION MEETING

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A. Construction Manager will schedule and conduct a preconstructionmobilization conference in person before starting construction, at a time convenient to Contractor, Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location.
   1. Required Attendees: Owner, Architect, and Contractor.

B. Agenda: Project Manager, Construction Manager; Contractor and its superintendent. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
   1. Execution of Agreement.
   2. Submission of executed bonds and insurance certificates.
   3. Distribution of Contract Documents.
   4. Submission of list of Subcontractors, list of products, schedule of values, and progress schedule.
   5. Designation of personnel representing parties in Contract, Architect, and consultants.
   6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal requests, requests for information, Change Orders, and Contract closeout procedures.
   7. Scheduling.
   8. Scheduling activities of code required special inspections.
   9. Critical work sequencing and long lead items.
   10. Lines of communications.
   11. Testing procedures.
   12. Application for payment procedures.
   13. Use of web-based Project software.
   14. Procedures for testing and inspecting.
   15. Procedures for processing Applications for Payment.
   16. Use of the premises by Owner and Contractor.

17. Owner requirements.
18. Construction facilities, temporary utilities, and controls provided by Owner.
19. Survey and Project layout.
20. Work restrictions.
21. Working hours.
22. Schedules.
23. Responsibility for temporary facilities and controls.
24. Construction waste management and recycling.
25. Office, work, and storage areas.
26. Security and housekeeping procedures.
27. Record documents maintenance procedures.
28. Equipment startup requirements.
29. Inspection and acceptance of equipment put into service during construction period.

C. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
   1. Format: PDF file.
   2. Distribution: Project management website.

1.6 PROGRESS MEETINGS

A. Schedule and administer virtual progress meetings throughout progress of the Work at minimum weekly intervals.

B. Make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, and record minutes.

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C. Required Attendees: Job superindendent, major Subcontractors, Owner, Architect, and Construction Manager.

D. Agenda:
   1. Previous meeting minutes review.
   2. Work progress review.
   3. Field observations, problems, and decisions.
   4. Problems impeding planned progress identification.
   5. Submittal schedule and status review.
   6. Off-site fabrication and delivery schedules review.
   7. Progress schedule maintenance.
   8. Corrective measures to regain projected schedules.
   9. Planned progress during succeeding time interval.
   10. Projected progress coordination.
   11. Quality and work standards maintenance.
   12. Effect of proposed changes on progress schedule and coordination.
   13. Other business relating to Work.
   14. Access and site use.
   15. Temporary facilities and controls.
   16. Status of correction of deficient items.
   17. Field observations.
   18. Status of RFIs.
   19. Status of Proposal Requests.
   20. Pending changes.

21. Status of Change Orders.
22. Documentation of information for payment requests.

E. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
1. Format: PDF file.
2. Distribution: Project management website.

1.7 COORDINATION MEETINGS

A. Prepare separate coordination meetings for clash detection reconciliation. Schedule and administer meetings at minimum two week intervals.

B. Begin coordination efforts before installation of the Work. Installation of the Work may occur simultaneously with the coordination meetings, provided known conflicts are resolved.

C. Required Attendees: Installer company representatives having authority to make decisions.
1. Contractor Team: Project Manager and Site superintendent and applicable Subcontractors and material suppliers.
2. Owner Team: Owner representative.
3. Design Team: Architect and applicable consultants.

D. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
1. Content: Itemized lists of conflicts and their resolutions. Where no resolution was established, list required missing information.
2. Format: PDF file.
3. Distribution: Project management website.

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1.8 PREINSTALLATION MEETINGS

A. When required in individual Specification sections, convene preinstallation meetings before starting Work of specific sections.
1. Pre-installation conferences are required before cut-overs, shut-downs, start-up, and final system testing.
2. Contractor will schedule preinstallation meetings.

B. Require attendance of parties directly affecting or affected by work of the specification section.

C. Notify Architect, Owner, and Construction Manager five days in advance of meeting date.

D. Prepare agenda and preside at meeting.

E. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
1. Delivery, storage, preparation, and installation procedures.
2. Installation sequencing.
3. Approved submittals review.
4. Manufacturers written recommendations and instructions review.
5. Related work coordination.

6. Compatibility of materials with previously installed work.
7. Field samples or mockups requirements.
8. Surrounding work protection.
9. Installation tolerances and their impact on preceding and subsequent work.
10. Testing and inspections.
11. Protection after installation.
12. Warranty requirements.
13. Other items required in individual specification sections.
14. Review of mockups.
15. Possible conflicts.
16. Time schedules.
17. Required performance results.
18. Regulations of authorities having jurisdiction.

F. Record minutes and distribute within two days after meeting to meeting participants and others affected by decisions made in meeting.
1. Format: PDF file.
2. Distribution: Project management website.

G. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

1.9 REQUESTS FOR INTERPRETATION OR INFORMATION - RFI

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A. RFIs will be accepted and processed by Architect regarding Architect Contract Documents, only.
1. Make requests regarding preliminary drawings or specifications by normal correspondences, not by RFI. Architect responses to such requests do not constitute Contract requirements for Work.
2. Architect will only respond to Contractor submitted RFIs.

B. Acceptable RFI Purposes:
1. Errors, inconsistencies, or omissions are discovered in Contract Documents.
2. Contract Documents or existing conditions do not comply with applicable codes or regulations.
3. Existing conditions are not as described in Contract Documents or other available Project documents.
4. RFIs for other purposes are not permitted.

C. Owner Documents: Make requests for information or interpretation of Owner prepared Contract Documents by normal correspondence, not by RFI. Owner is responsible for responding to such requests. Provide contemporaneous copies of such requests to Architect.

D. RFI submission constitutes representation that Contractor made good faith, careful study and comparison of Contract Documents, field conditions, other Project information, Contractor prepared coordination drawings, and prior project correspondence or documentation before submitting RFI.

E. Submit RFIs on project management website using AIA Document G716 or Architect accepted form.
1. Attach sketches, diagrams, product data sheets, and other supplementary information relevant to the RFI. Include a detailed, legible description of item needing information or interpretation and the following:
a. Project name.
b. Date.

c. Name of Contractor.
d. RFI number, numbered sequentially.
e. RFI topic.
f. Specification Section number and title and related paragraphs, as appropriate.
g. Drawing number and detail references, as appropriate.
h. Field dimensions and conditions, as appropriate.
i. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
j. Contractor's signature.
k. Attachments: Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
    1) Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

F. Architect and Construction manager action: Allow five business days for response. RFIs received by Architect after 2:00 PM will be considered as received on following day.
1. Architect may request additional information or clarification, in which case Architect time for response will date from time of receipt of requested additional information or clarification from Contractor.
2. The following Contractor-generated RFIs will be returned without action:
    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract.
    e. equests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

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G. When Contractor believes Architect response requires change in Contract Time or Contract Sum, or when Contractor disagrees with Architect response, notify Architect in writing within three days of receipt of response.

H. RFI Log: Maintain tabular log, submitted weekly, of RFIs and submit copies at Progress Meetings. Include:
1. Project name.
2. Contractor, Architect, and Construction Manager names.
3. RFI number.
4. RFI subject.
5. Submission date and time.
6. Response date.
7. RFI description.
8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.

I. On receipt of Architect's and Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect and Construction Manager within three days if Contractor disagrees with response.

1.10 PROJECT MANAGEMENT WEBSITE

A. Provide and administer project management website for communication and documentation.
   1. Manufacturers and Products:
      a. Autodesk Construction Cloud.
      b. Autodesk PlanGrid.
      c. InEight Software Document.
      d. NewForma ConstructEX.
      e. NewForma Project Center.
      f. Oracle Primavera.
      g. Part3 Technologies Corp. Part3.
      h. PMWeb.
      i. Procore Technologies Procore.
      j. Trimble ProjectSight.
   2. Types of Communication and Documentation on Project Management Website:
      a. Submittals and submittal logs.
      b. Schedules.
      c. Meeting minutes.
      d. RFI forms and logs.
      e. Project correspondence.
      f. Project directories.
      g. Photographic documentation.
      h. Payment applications.
      i. Project closeout documents.
      j. Contract modification forms and logs.
   3. Provide up to 20 Project management software user licenses for use of Owner, Construction Manager, Architect, and Architect's consultants. Provide four hours of software training at Architect's office for web-based Project software users if requested / required.
   4. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect and Owner. Provide data in locked format to prevent further changes.

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B. PDF DOCUMENT PREPARATION.
   1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
   2. Name file with submittal number or other unique identifier, including revision identifier.
   3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

C. COORDINATION OF THE WORK.
   1. Coordinate prior to installation.
   2. Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary facilities to minimize waste.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 32 00

CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Construction bar chart schedule.
2. Critical path method schedule.
3. Construction photographs.

1.2 INFORMATIONAL SUBMITTALS

A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file.
2. PDF file.

B. Preliminary Schedule:
1. Submittal of cost-loaded startup construction schedule will not constitute approval of schedule of values for cost-loaded activities.

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C. Contractor's Baseline Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. If requested by Construction Manager, submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.

D. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports to contain activity number, activity description, cost and resource loading, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Total Float Report: List of activities sorted in ascending order of total float.

E. Construction Schedule Updating Reports: Submit with Applications for Payment.

F. Daily Construction Reports: Submit at weekly intervals.

G. Site Condition Reports: Submit at time of discovery of differing conditions.

H. Submittals Schedule: Arrange the following information in a tabular format:
1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Submittal category (action or informational).
4. Name of Subcontractor.

5. Description of the Work covered. Scheduled date for Architect's final release or approval.

I. Special Reports: Submit at time of unusual event.

J. Photographs.

1.3 QUALITY ASSURANCE

A. Qualifications:
1. CPM Scheduler: Contractor personnel or Consultant specializing in CPM scheduling, and experienced in CPM scheduling comparable projects.
2. Contractor Administrative Personnel: Five years minimum experience using and monitoring CPM schedules on comparable projects.

1.4 BAR CHART PROGRESS SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Extend schedule from date established for the Notice to Proceed to date of Substantial Completion and Final Completion.
2. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
3. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
4. As the Work progresses, indicate Final Completion percentage for each activity.

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B. Prepare progress schedule as a horizontal bar chart with separate bar for each major portion of Work or operation.

C. Show complete sequence of construction by activity, with dates for beginning and completion of each construction element.
1. Identify activities by Specification section number.
a. Define activities so no activity is longer than 20 days, unless specifically allowed by Architect and Construction Manager.
2. Identify work of logically grouped activities.

D. Show accumulated completion percentage of each item, and total percentage of Work completed as of the first day of each month.

E. Submittals:
1. Submit initial progress schedule within 15 days after Notice to Proceed.
a. After review by Owner, Architect, and Construction Manager, resubmit schedule within 10 days.
2. Submit revised schedule with each application for payment.
3. Distribute reviewed schedules to Project site file, Subcontractors, Suppliers, and other affected Parties.
a. Instruct recipients to promptly report, in writing, anticipated problems due to schedules.
4. Upload reviewed schedules to project website. Notify affected parties.
a. Instruct recipients to promptly report, in writing, anticipated problems due to schedules.

5. Show estimated percent completion for each item of Work at each submission.
6. Provide separate schedule of submittal dates for shop drawings, product data, and samples, including Owner furnished products.
    a. Include dates reviewed submittals are required from Architect.
    b. Include dates for finish selections.
    c. Include delivery dates for Owner furnished products.

F. Revisions: Provide narrative report to define problem areas, anticipated delays, and impact on Schedule.
1. Include activity progress and projected completion dates.
2. Identify activities modified since previous submittal.
3. Report actual and proposed corrective actions.
4. Report revisions impact on other Contractors.

G. Milestones: Include milestones specified in Contract Documents and the following:
1. Building enclosure.
2. HVAC startup.

H. Recovery Plan: When Work is 14 days minimum behind published schedule, submit recovery schedule.
1. Include plan for work periods, staff size, and date when recovery is complete.

I. Distribute schedule by uploading to Project website.

1.5 CRITICAL PATH METHOD PROGRESS SCHEDULE

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A. Prepare network analysis diagrams and supporting mathematical analyses using Critical Path Method.

B. Format:
1. Listings: Reading from left to right, in ascending order for each activity. Identify each activity with applicable specification section number.
2. Print Sheet Size: Maximum 36 x 48 inches.
3. Scale and Spacing: To allow for notations and revisions.
4. Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges. Subnetworks on separate sheets are permissible for activities clearly off the critical path.

C. Illustrate sequence and interdependence of activities and sequence of work.

D. Illustrate complete sequence of construction by activity, identifying work of separate stages. Include legend for symbols and abbreviations used. Show the following information:
1. Submittal dates.
2. Submittal return dates.
3. Long lead item procurement, delivery, and installation.
4. Critical item procurement, delivery, and installation.
5. Owner furnished item procurement, delivery, and installation.
6. Testing dates.
7. Utility interruptions.
8. Testing and inspection.
9. Commissioning.
10. Punch list and Final Completion.
11. Activities occurring following Final Completion.

E. Mathematical Analysis: Tabulate each activity on detailed network diagrams, using calendar dates, and identify for each activity:
   1. Preceding and following event numbers.
   2. Activity description.
   3. Estimated duration of activity, in maximum 15 day intervals.
   4. Earliest start date.
   5. Earliest finish date.
   6. Actual start date.
   7. Actual finish date.
   8. Latest start date.
   9. Latest finish date.
   10. Total and free float; accrue float time to Owner and to Owner benefit.
   11. Monetary value of activity, keyed to schedule of values.
   12. Percentage of activity completed.
   13. Responsibility.

F. Analysis Program: Capable [of compiling monetary value of completed and partially completed activities], of accepting revised completion dates, and recomputation of scheduled dates and float.

G. Required Reporting: List activities in sorts or groups.
   1. Preceding Work item or event number from lowest to highest.
   2. Longest float, then in order of early start.
   3. Responsibility in earliest possible start date order.
   4. Latest allowable start dates.
   5. Latest allowable finish dates.
   6. Contractor periodic payment request sorted by schedule of values listings.
   7. Listing basic input data generating report.
   8. Listing activities on critical path.

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H. Submittals: Submit to Owner, Architect, and Construction Manager.
   1. Within 14 days after date established in Notice to Proceed, submit proposed preliminary network diagram defining planned operations for first 90 days of Work, with general outline for remainder of Work.
   2. Participate in reviewing preliminary and complete network diagrams jointly with Construction Manager.
   3. Within 20 days after joint review of proposed preliminary network diagram, submit draft of proposed complete network diagram. Include written certification that major Subcontractor have reviewed and accepted proposed schedule.
   4. Within[10] days after joint review, submit complete network analysis consisting of network diagrams and mathematical analysis.
   5. Submit updated network schedules as follows:
      a. With each Application for Payment.
      b. Every 30 days.

I. Review and Evaluation:
   1. Participate in joint review and evaluation of network diagrams and analysis with Construction Manager at each submittal.
   2. Evaluate Project status to determine work behind schedule and work ahead of schedule.
   3. After review, revise network diagrams and analysis incorporating results of review, and resubmit within 10 days.

J. Updating Schedule:
   1. Maintain schedules; record completed activities actual start and finish dates.
   2. Include activity progress to date of revision, with projected activity completion date. Update diagrams to graphically depict current Work status.
   3. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
   4. Include changes required to maintain Date of Substantial Completion.
   5. Submit sorts required to support recommended changes.
   6. Prepare narrative report defining problem areas, anticipated delays, and impact on schedule. Report corrective action taken or proposed and its effect[including effects of changes on schedules of separate contractors].

K. Distribution:
   1. Following joint review, distribute copies of updated schedules to Contractor Project site file, to Subcontractors, suppliers, Architect, Owner, and Construction Manager.
   2. Following joint review, upload updated schedules to Project website.
   3. Instruct recipients to promptly report, in writing, problems anticipated by projections shown in schedules.

1.6 CONSTRUCTION PHOTOGRAPHS

A. Assign a member of Contractor staff to take construction record photographs during construction.

B. Digital Camera: Sensor resolution of 10 megapixels minimum. Use dedicated cameras; mobile phone images are not acceptable for required record photographs.

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C. Format: 3200 by 2400 pixels minimum, in unaltered original JPEG or TIFF files, uncropped, date and time stamp in image file metadata, saved in folder named by date of photographs.
   1. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimal distortion.

D. Required Photographs:
   1. Two aerial photographs of site at beginning and completion of Work.
   2. Existing conditions that might be misconstrued as damage from construction activities.
   3. Take photographs monthly to record general progress at time of application for payment.
   4. Mockups, Field Samples: Photograph each step of installation to record concealed conditions.
   5. Accidents and damage to construction in process.
   6. Substantial Completion: Photograph primary public areas and representative offices.

E. Upload photographs to Project website contemporaneously with monthly applications for payment.
   1. Include list of photographs indication location and direction of view.

F. After transmittal, Owner and Architect may make prints or use the photograph files without limitation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

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SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Submittals schedule.
2. Submittal procedures.
3. Submittal processing.
4. Proposed products list.
5. Action submittals.
6. Informational submittals.
7. Delegated design services.

1.2 SUBMITTALS SCHEDULE

A. Submit list of submittals with expected submittal dates. Coordinate with dates for start of related construction shown in the construction progress schedule.

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B. Transmit submittals schedule electronically to Architect and Construction Manager not later than date of first application for payment.
1. No submittals will be reviewed until the initial submittals schedule is received.
2. Revise submittals schedule as directed by Architect and Construction Manager.
3. Revise submittals schedule to be current with construction progress schedule revisions.

C. Submittals Schedule: Provide following information in tabular format with separate line items for each required type of submittal.
1. Specification section number and title.
2. Name of Subcontractor.
3. Description of Work covered by submittals.
4. Submittal type: action or informational.
5. Scheduled date for first submittal.
6. Scheduled date for Architect and Construction Manage final release or approval.
7. Schedule dates for purchasing.
8. Schedule dates for fabrication.
9. Schedule dates for installation.

1.3 SUBMITTAL PROCEDURES

A. Transmit submittals with AIA Form G810 or Architect accepted form.

B. Sequentially number transmittal forms. Number revised submittals with original number and sequential alpha numeric suffix.

Example	072100.11.A.R02 where:
072100 =	Specification section number
11 =	Sequential submittal number
A =	Alpha descriptor identifying each major element within single submittal
R02 =	Sequential resubmission number

C. Assemble submittals to show:
1. Project, Contractor, Subcontractor, and Supplier identification.
2. Pertinent drawing and detail number, and specification section number.
3. Space for Contractor and Architect and Construction Manage review stamps on first page.
4. Variations from Contract Documents highlighted.
5. Product and system limitations potentially detrimental to Work highlighted.
6. Changes since previous submission.

D. Apply stamp and sign or initial certifying that review, approval, verification of required products, field dimensions, adjacent Work, and information coordination is per Work and Contract Documents.

E. Schedule submittals to expedite Project. Coordinate submission of related items for simultaneous submittal.
1. Submit action submittals and informational submittals for each Specification Section under separate transmittal.
2. Submit sustainable design submittals separately from other submittals.

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F. Submit one native, editable PDF electronic file for each required submittal to Construction Manager via webs based Project Management Software.
1. Page Size: 8-1/2 x 11 inches minimum; 30 x 42 inches maximum.
2. Submit PDF sample identification with image of each physical sample.
3. Bookmark PDF drawing files showing sheet numbers and titles.
4. Bookmark PDF product files showing product names and data types.
5. Annotated PDF electronic file will be returned to Contractor.

G. Distribute reviewed submittals to affected Parties.
1. Instruct parties to promptly report inability to comply with requirements.

H. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
1. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.
2. Architect's Digital Data Files: Electronic digital data files of the Contract Drawings will not be provided by Architect for Contractor's use in preparing submittals.

I. Options: Identify options requiring selection by Architect.

J. Incomplete Submittals: Partial or incomplete submittals may be, at the discretion of the Architect and Construction Manager, be returned to the Contractor without action for coordination, completion and resubmittal.

1.4 SUBMITTAL PROCESSING

A. Allow 15 days for each initial submittal and resubmittal review.
   1. Allow sufficient submittal, resubmittal and review time to avoid delaying Work.
   2. When intermediate submittal is necessary, process as for initial submittal.

B. Allow 21 days for each sequential submittal or resubmittal review.

C. Architect will promptly notify Contractor when:
   1. Submittal processing must be delayed for coordination with other submittals.
   2. Additional information is required to process submittal.

D. Contract Time extension is not permitted from failing to make submittals sufficiently in advance of Work to permit processing.

1.5 PROPOSED PRODUCTS LIST

A. Submit initial proposed products list within 15 days after Notice to Proceed.
   1. After review by Owner and Architect, resubmit list within 10 days.

B. Submit revised list with each Application for Payment until all required products are identified.

C. Include major products from each Specification section, with name of manufacturer, trade name, and model number.
   1. Identify proposed products that are specified proprietary products.

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D. When proposed products are one of the specified proprietary products identified by manufacturer, and model number, additional submittals for that product are not required except as follows:
   1. Shop Drawings are required for products specially fabricated to size or configuration to comply with project conditions.
   2. Samples are required for products where color, texture, finish, pattern and other selections are required.

E. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 ACTION SUBMITTALS

A. Submit action submittals for Architect and Construction Manager review for conformance with Contract Documents.
   1. Provide additional information or clarification upon Architect request.
   2. Action submittals will be returned with Architect and Construction Manager stamp indicating submittal status.
   3. Maintain one set of Architect reviewed submittals at Project site for reference.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
   1. Clearly mark data files indicating applicable products, models, options, and other data.
      a. Identify required selections that need to be made by Architect.
   2. Supplement manufacturer standard data with Project specific information.
   3. When requested or specified, submit color charts or sample kits for initial color selections.

a. Include full range of manufacturer standard colors, textures, and patterns.
b. Include custom colors and other product characteristics where specified.

4. Show product utility and electrical characteristics.
   a. Show utility connection types, sizes and locations.
   b. Show maintenance and service access locations and required clearances.
5. Do not include Safety Data Sheets - SDS - in submittals.
   a. When requested by Owner, submit SDS directly to Owner.
6. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

C. Shop Drawings: Prepare Project-specific information that fully illustrates requirements in the Contract Documents. , drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
   1. Show product specific Project construction, including sizes, configurations, and details.
   2. Show product connections and anchorages to adjacent systems and building structure.
      a. Show location and magnitude of loads transferred to building structural systems.
   3. Show terminations and interface with adjacent systems and materials.
   4. Show product utility and electrical characteristics.
      a. Show utility connection types, sizes and locations.
      b. Show maintenance and service access locations and required clearances.
   5. Identify required tolerances for successful installation.
   6. Identify required and actual field measurements necessary for fabrication.

D. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.
   1. Submit manufacturer's color charts for initial sample selection, consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
   2. Submit three Samples, unless a greater number is specified in individual Specification sections.
      a. Attach printed PDF submittal transmittal and sample image to each sample.
   3. Show Project specific aesthetic, color, and finish selections.
   4. Show functional and aesthetic characteristics of the product, with integral parts and attachment devices.
   5. Submit Samples for interfacing Work at same time where aesthetic selection coordination is required.
   6. One sample will be retained by Architect. Remaining Samples will be returned.
   7. Maintain one approved sample at Project site for Architect reference.
   8. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
   9. Permanently attach label on unexposed side of Samples that includes project name, submittal number, product name, name of manufacturer, and generic description of Sample.
   10. Provide Sample PDF submittal through Web-Based Project Management Software transmittal. Include digital image file illustrating Sample characteristics and identification information for record.

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1.7 INFORMATIONAL SUBMITTALS

A. Submit informational submittals for Architect knowledge and for limited purpose of assessing conformance with Contract Documents.
   1. Provide additional information or clarification upon Architect request.
   2. Maintain one set of submittals at Project site for Architect reference.

B. Certificates: Prepared by manufacturer or independent third party attesting to product compliance with Contract Documents.
   1. Submit supporting reference data, affidavits, and certifications.
   2. Certificates may be recent or previous test results acceptable to Architect.

C. Delegated Design Submittals:
   1. Shop Drawings and calculations, signed and sealed by licensed professional responsible for designing Work shown on approved Shop Drawings.
      a. Submit in quantity and form suitable for submission to and approval by authority having jurisdiction.
      b. Revise submittal and provide additional information when required by authority having jurisdiction.
   2. Submit certificate of professional liability insurance from licensed professional responsible for design.

D. Test and Evaluation Reports: Manufacturer and Independent testing agency reports attesting to product compliance with Contract Documents.

E. Source Quality Control Submittals: Shop test and inspection reports attesting to product compliance with Contract Documents.

F. Field Quality Control Submittals: Field test and inspection reports attesting to product compliance with Contract Documents.

G. Manufacturer Reports: Field test reports recording outcome of site observation.
   1. Submit report within five days of site observation.

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H. Special Procedure Submittals: Describe perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

I. Qualification Statements: Manufacturer, fabricator, installer, and Contractor testing agency statements, quality manuals, and credentials showing compliance per Contract Documents.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

SECTION 01 40 00

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Quality Assurance.
2. Quality control and control of installation.
3. Delegated design services.
4. Tolerances.
5. References.
6. Labeling.
7. Mockups.
8. Field samples.
9. Testing and inspecting services.
10. Manufacturer field services.
11. Test reports and certifications.

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1.2 REFERENCES

A. Definitions:
1. Experienced: An entity or individual who successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project, with a five year record of successful performance, and familiar with special requirements of product, assembly, project, and authorities having jurisdiction.

1.3 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturers: Experienced firms with sufficient production capacity to produce units required.
2. Fabricators and Finish Applicators: Experienced firms with sufficient production capacity to produce units required.
3. Installers: Experienced firms or individuals with sufficient manpower to produce Work required.
4. Testing Agencies: Experienced firms with sufficient capacity and necessary equipment to perform tests required, following one of the following programs.
   a. A nationally recognized testing laboratory per 29 CFR 1910.7.
   b. Accredited agency per NIST National Voluntary Laboratory Accreditation Program.
5. Licensed Professionals: Experienced individuals, licensed or otherwise legally qualified to practice in the jurisdiction where the Project is located.

1.4 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Follow specified reference standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements include higher standards or more precise workmanship.

C. Measure in place and existing construction as needed for fabrication and execution. No changes to Contract Sum or Contract Time will be allowed for differences between Drawing dimensions and field measurements where no measurements were performed.

1.5 DELEGATED DESIGN SERVICES

A. Where delegated design is specified, follow specified performance and design criteria.
   1. If criteria are not sufficient, submit RFI for needed criteria.

1.6 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Follow manufacturer tolerances. When manufacturer tolerances conflict with Contract Documents, request clarification from Architect before proceeding.

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C. Adjust products to appropriate dimensions; position before securing products in place.

1.7 REFERENCE STANDARDS

A. Abbreviations and Acronyms: Names of trade associations, standards generating organizations, governing authorities, and other entities are frequently referred to in Contract Documents by acronyms and abbreviations. Request explanation of unknown terms from Architect.

B. For products or workmanship specified by association, trade, or other consensus standards, follow requirements of standard, except when more rigid requirements are specified or are required by applicable codes.

C. Follow reference standards by date of issue current on date of Contract Documents, except where specific edition date is required by code.

D. Where specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

E. Provisions within cited reference standards changing Owner, Architect, and Contractor duties and responsibilities from contractual requirements are void.

1.8 LABELING

A. Attach labels from agencies approved by authority having jurisdiction for products, assemblies, and systems required to be labeled by applicable code.

B. Label Information: Include approved agency identification on each label. Install products with labels visible. Include:
   1. Manufacturer name.
   2. Model number.
   3. Serial number.
   4. Performance characteristics.

1.9 MOCKUPS

A. Definition:
   1. Mockups are constructed to demonstrate materials and workmanship for review by Architect, Owner, and Construction Manager.
      a. Notify CM and Architect Seven [7] working days in advance of dates and times when mockups will be constructed.
      b. Allow Seven [7] working days for initial review and each re-review of each.

B. Construct mockups at Project site in locations acceptable to Construction manager unless laboratory mockups are specified.

C. Construct mockups in compliance with applicable Specification sections.
   1. Design and construct foundations, supports, framing, and bracing for freestanding mockups.
   2. Demonstrate the proposed range of aesthetic effects and workmanship.

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D. Photograph construction to record concealed conditions per requirements of Section 013200. Make photographs available to Architect and Owner when requested.

E. Mockups are subject to testing specified for constituent products.

F. Approved mockups establish work results standard.

G. Protect mockups against damage until removal is authorized by Construction Manager.

H. Mockups may remain as part of the Work only when so designated in individual Specification sections.

1.10 FIELD SAMPLES

A. Definition:
   1. Field samples are assemblies constructed to demonstrate materials and workmanship for review by Architect and Construction Manager.
      a. Construct field samples in final locations in sizes described in technical Specifications sections.

B. Construct field samples in compliance with applicable Specification sections.

C. Approved field samples establish Work results standard.

D. Protect field samples against damage until Substantial Completion.

E. Approved, undamaged field samples may remain as part of the Work unless designated in individual Specification sections.

1.11 TESTING AND INSPECTION SERVICES

A. Except where specified as Owner responsibility, employ and pay for specified services of an independent firm to perform testing and inspections.
   1. Owner testing and inspecting agencies will be identified to Contractor.
   2. Copies of reports prepared by Owner testing and inspecting agencies will be sent to Contractor.

B. Include dates for agency testing and inspecting in Progress Schedule and provide minimum 10 days prior notice to agencies.
   1. Provide access to the Work as requested by testing and inspecting agencies.
   2. Provide samples of materials, design mixes, equipment, tools, storage for Samples, and assistance by incidental labor requested by agency.

C. Testing and employment of testing and inspecting agencies shall not relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

D. Retest and reinspect defective work when required by Architect and Construction Manager.
   1. Failed Test Retest Cost: Contractor responsibility.

E. Limits on testing and inspecting agencies:
   1. Agency does not have authority to release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency does not have authority to approve or accept any portion of Work.
   3. Agency may not assume duties of Contractor.
   4. Agency does not have authority to stop Work.

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1.12 MANUFACTURER FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe and provide instructions when necessary for acceptable:
   1. Installation conditions.
   2. Workmanship quality.
   3. Equipment startup.
   4. Equipment test, adjust, and balance.

B. Submit qualifications of observer to Architect 14 days, minimum, in advance of required observations.

C. Report observations and site decisions or instructions that are supplemental or contrary to Contract Documents or manufacturers written instructions.

D. Submit written inspection reports per Section 013300.

1.13 TEST REPORTS AND CERTIFICATIONS

A. When specified in individual Specification sections, require material or Product suppliers or manufacturers to provide test reports and manufacturer certifications.

B. Show that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Submittals may be recent or previous test results on material or Product, as acceptable to Architect.

D. Submit reports and certifications per Section 013300.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 50 00

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Temporary sanitary facilities.
2. Temporary utilities.
3. Access aids.
4. Vehicle access and parking.
5. Temporary barriers, enclosures, and partitions.
6. Field offices and sheds.
7. Security.
8. Traffic regulation.
9. Project identification.
10. Fire prevention controls.
11. Temporary controls.
12. Progress cleaning and waste removal.

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1.2 TEMPORARY SANITARY FACILITIES

A. From start of operations on site, provide and maintain self contained toilet units and hand washing facilities of number, type, and capacity acceptable to authorities having jurisdiction.

B. Provide safety shower and eyewash facilities.

C. Provide drinking water for construction staff.

1.3 TEMPORARY WATER AND SEWER SERVICE

A. Water from existing facility is available for construction use without charge to Contractor. Provide means of distribution from existing sources.

B. Provide for control and drainage of surface runoff, including provision of temporary drains and pumps.

C. Contractor is responsible for sewage costs during construction period.

1.4 TEMPORARY ELECTRICITY

A. Provide temporary electric feeder from existing building for construction use.
1. Usage Costs: Contractor; provide temporary meter.

B. Where electricity for construction operations is needed with characteristics different from that available from existing service, provide and pay for separate temporary source for such power.

C. Provide power outlets, with branch wiring and distribution boxes. Provide flexible power cords as required for portable construction tools and equipment.

D. Allow incidental use of temporary electricity without charge by Architect and its consultants, Owner, and testing and inspecting agencies.

E. Provide feeder switch at source distribution equipment.

F. Permanent convenience receptacles may be utilized during construction.

1.5 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Provide and maintain minimum lighting levels per OSHA standard 1926.56(a) or local requirement, whichever is more stringent.

B. Provide additional temporary lighting as needed for construction activities, observations, and inspections.

C. Maintain lighting and provide routine repairs.

D. Permanent building lighting may be utilized during construction.
   1. Fixtures with Replaceable Lamps: Provide new lamps before inspection for Substantial Completion.

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E. When requested by Architect, provide temporary lighting matching specified permanent lighting for observing finish colors.

F. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

1.6 TEMPORARY HEATING

A. Provide and pay for temporary heating devices to maintain specified conditions until permanent HVAC system is available for use.

B. Maintain minimum 50 deg F ambient temperature within the building where construction is in progress, unless higher temperature is specified in technical Specification sections.

C. Before operating permanent equipment for construction period heating, verify that installation is approved for operation, equipment has been lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

1.7 TEMPORARY COOLING

A. Provide and pay for cooling devices and cooling as needed to maintain specified conditions for construction and storage operations.

B. Before operating permanent equipment for construction period cooling, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.

C. Maintain maximum 80 deg F ambient temperature within the building where construction is in progress, unless lower temperature is specified in technical Specification sections.

1.8 TEMPORARY VENTILATION

A. Ventilate enclosed areas to achieve curing of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Utilize existing cooling facilities.
   1. Provide maintenance and replacement of filters and worn or consumed components during construction period.

C. Supplement permanent equipment with temporary fans as needed to maintain clean air for construction operations.

1.9 TEMPORARY TELEPHONE AND DATA SERVICE

A. Provide internet access in field office that is available for use by Architect, Owner, and Construction Manager.

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1.10 ACCESS AIDS

A. Provide temporary ramps, stairs, ladders, hoists, scaffolding, platforms, walkways, and other access facilities as needed for execution, observation, and inspection of the Work.

B. Provide boards in tread and landing pans of steel pan stairs used for access until filled with concrete.

C. Existing stairs will be designated for use by construction personnel. Contractor is responsible for cleaning and repair of damage resulting from construction use.

1.11 VEHICLE ACCESS

A. Provide unimpeded access for emergency vehicles.

B. Provide and maintain access to fire hydrants and control valves free of obstructions.

C. Provide means of removing mud from vehicle wheels before entering public streets.

D. Existing onsite streets and driveways may be used for construction traffic. Prohibit tracked vehicles on pavements.
   1. Owner will designate roads available for construction use.

1.12 VEHICLE PARKING

A. Designated existing parking facilities may be used by construction personnel and for construction vehicles.
   1. Parking is subject to Owner restrictions and limitations of liability.
   2. Identify vehicles per Owner requirements.
   3. Prohibit heavy vehicles and construction equipment in parking areas.
   4. Maintain construction parking areas free of construction soiling and debris, and for repairing damage resulting from use.

B. When site space is not adequate, provide additional offsite parking.

C. Designate parking spaces for Owner, Architect, and Construction Manager.

D. Maintenance:
   1. Maintain traffic and parking areas in sound condition and free of excavated material, mud, snow, and ice.
   2. Maintain existing paved areas used for construction operations. Promptly repair damage. Remove standing water.

E. Removal, Repair:
   1. Remove temporary materials and construction before Substantial Completion.
   2. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
   3. Repair existing facilities damaged by use, to original condition.

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1.13 TEMPORARY BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   1. Arrange for Owner continuous use of site.

B. Provide barricades and covered walkways required by authorities having jurisdiction for public rights of way.

C. Protect non owned vehicular traffic, stored materials, site, and structures from damage.

D. Provide protection for plants designated to remain. Replace damaged plants.

E. Tree and Plant Protection:
   1. Protect existing trees and plants that are designated to remain.
   2. Employ qualified tree surgeon to remove roots and branches that interfere with construction.
   3. Provide temporary barriers around individual or groups of trees and plants.
      a. Barrier Height: 6 feet.
   4. Do not permit vehicular traffic, parking, storage of materials, dumping of harmful chemicals or liquids, or standing or continuously running water within root zones.
   5. Supervise earthwork operations to prevent damage to root zones.
   6. Replace trees and plants that are damaged or destroyed by construction operations.

F. Fencing:
   1. Provide temporary fencing for construction operations.

2. Construction: Commercial grade chain link and concrete bases to support posts.
3. Height: 6 feet.
4. Location: As required to protect construction operations, materials, and equipment.
5. Gates: Vehicle and pedestrian, locking.

1.14 TEMPORARY ENCLOSURES

A. Provide temporary weathertight closures for exterior openings to provide acceptable interior working conditions, to allow for temporary heating and maintenance of ambient temperatures required in individual specification sections, to protect the Work, and to prevent entry of unauthorized persons.
   1. Provide access doors with locking hardware.

B. Roof Openings and Replacement:
   1. Weather Limitations: Remove roofing, skylights, and rooftop equipment when weather conditions do not threaten the integrity of the building contents or occupancy.
   2. Until permanent roof is watertight, provide and maintain temporary weathertight closures.

1.15 FIELD OFFICES AND SHEDS

A. Provide temporary field offices and storage sheds needed for construction activities.

B. Temporary Structures:
   1. Portable or mobile buildings, weathertight, with floors raised above ground.
   2. Insulated construction appropriate for use.
   3. Provide connections for utility services when required.
   4. Provide entrance steps and landings.
   5. Storage Environmental Conditions: As required for stored materials to meet manufacturer limitations.

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C. Common Use Field Office: Install within 15 Days after Notice to Proceed.
   1. Conference table and chairs for 12 persons.
   2. Of sufficient size to accommodate needs of Owner, Architect, Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections.
   3. Storage for construction documents and submittals.
   4. Electrical power, lighting, heating, and air conditioning, with no fewer than one receptacle on each wall.
   5. Internet connection with WiFi access for Project participants.
   6. Exterior lighting for entrance steps and landings.
   7. Weekly janitorial service and trash removal.
   8. Maintain accessway free of mud, water, and snow.

D. Remove temporary offices and sheds when authorized or directed by Construction Manager.

1.16 SECURITY

A. Security Program:
   1. Protect Work and existing premises from theft, vandalism, and unauthorized entry.
   2. Initiate program at Project mobilization.

a. Coordinate with Owner to follow existing security programs.
3. Maintain program throughout construction period until Owner occupancy.

B. Entry Control:
1. Restrict entry of persons and vehicles into Project site.
2. Allow entrance only to authorized persons with proper identification.
3. Maintain log of workers and visitors, make available to Owner on request.
4. Coordinate access of Owner personnel to site in coordination with Owner security forces.

C. Personnel Identification:
1. Provide identification badge to each person authorized to enter premises.
2. Employee badges shall include photograph, name, employer, and expiration date.
3. Maintain list of accredited persons, submit copy to Owner on request.
4. Require return of badges at expiration of employment on the Work.

1.17 TRAFFIC REGULATION

A. Signs, Signals, and Devices:
1. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.
2. Traffic Cones and Drums, Flares, and Lights: Acceptable to authority having jurisdiction.
3. Flag Operator Equipment: As required by authority having jurisdiction.

B. Flag Operators: Trained and equipped to regulate traffic when construction operations or traffic encroach on public traffic lanes.

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C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:
1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
2. Confine construction traffic to designated haul routes.
3. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

E. Traffic Signs and Signals:
1. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
2. Provide, operate, and maintain traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor control, and areas affected by Contractor operations.
3. Relocate as Work progresses, to maintain effective traffic control.

F. Removal:
1. Remove equipment and devices before Substantial Completion.
2. Repair damage caused by installation.
3. Remove post settings to depth of 2 feet.

1.18 PROJECT IDENTIFICATION

A. Project Identification Sign:
   1. Provide one painted sign of construction, design, and content shown on Drawings in designated locations.
   2. Content:
      a. Project title and Owner name.
      b. Names and titles of authorities.
      c. Names and functions of Architect and its consultants.
      d. Name and title of Contractor.
      e. Color rendering of Project.
   3. Graphic Design, Colors, Lettering Style: Architect Designated.
   4. Lettering: Series C of Standard Alphabet for Highway Signs, Public Roads Administration, Federal Works Agency.
   5. Project-identification-sign lighting daily from dusk until 12:00 midnight.

B. Project Informational Signs:
   1. Painted informational signs of same colors and lettering as Project Identification sign, or standard products; size lettering for legibility at 100 feet distance.
   2. Provide sign at each field office, storage shed, and directional signs to direct traffic into and within site. Relocate as Work progress requires.
   3. Provide municipal and state traffic agency directional traffic signs to and within site.
   4. No other signs are allowed without Owner permission except those required by Law.

C. Construct sign to withstand 60 mph wind velocity.

D. Sign Painter: Experienced professional sign painter.

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E. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for construction period.

F. Sign Materials:
   1. Structure and Framing: Wood or Steel.
   2. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inches thick, sizes to minimize joints.
   3. Rough Hardware: Galvanized or stainless steel.
   4. Paint and Primers: Exterior quality, primer and two semigloss finish coats; sign background color selected by Architect.
   5. Lettering: Exterior sign paint or pre-cut vinyl self-adhesive letters in Architect selected colors.

G. Installation:
   1. Install Project identification sign within 15 days after date of Notice to Proceed.
   2. Location: Construction Manager directed.
   3. Erect supports and framing on secure foundations. Rigidly brace and frame to resist wind loadings.
   4. Install sign surface plumb and level, with full contact butt joints. Anchor securely to support framing.
   5. Paint sign back, edges, and framing.
   6. Maintain project-identification-sign lighting daily from dusk until 12:00 midnight.

H. Maintenance: Maintain signs and supports clean, repair deterioration and damage.

I. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.19 FIRE PREVENTION CONTROLS

A. Prohibit smoking within buildings under construction and demolition. Designate area on site where smoking is permitted and provide approved ash receptacles.

B. Establish fire watch for cutting and welding and other hazardous operations capable of starting fires. Maintain fire watch before, during, and after hazardous operations until threat of fire does not exist.

C. Portable Fire Extinguishers: NFPA 10; 10 pound capacity, 4A-60B:C UL rating.
   1. Provide one fire extinguisher at each stair on each floor of buildings under construction and demolition.
   2. Provide minimum one fire extinguisher in every construction trailer and storage shed.
   3. Provide minimum one fire extinguisher on roof during roofing operations using heat producing equipment.

D. Make permanent fire protection system operational as soon as is practicable, and maintain system in use during remaining construction period.

E. Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.

F. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

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1.20 TEMPORARY CONTROLS

A. Roof Drainage:
   1. Maintain roof drainage, either by installing permanent or temporary roof drainage system.

B. Water Control:
   1. Grade site to drain. Prevent puddling or running water.
   2. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
   3. Provide water barriers to protect site from soil erosion.

C. Erosion Control: See Civil Drawings.

D. Dust Control:
   1. Execute Work by methods to minimize dust from construction operations.
   2. Provide positive means to prevent airborne dust from dispersing into atmosphere.
   3. Clean interior spaces before start of finish painting and continue cleaning as needed until all painting is complete.
   4. Schedule operations so that dust and other contaminants resulting from cleaning processes will not fall onto wet or newly coated surfaces.
   5. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum 36 by 60 inches.

E. Mold and Mildew Control:
   1. Provide continuous measures to prevent formation of mold and mildew in construction.
   2. Do not install materials sensitive to mold and mildew growth until protection can be provided.
   3. Promptly remove and replace materials exhibiting mold and mildew growth.

4. Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

F. Noise Control:
1. Advise Owner and Architect at least 7 days in advance before starting activities that are very loud.
2. Owner reserves right to have such activities performed outside its normal business hours.

G. Pest Control: Provide methods, means, and facilities to prevent pests, rodents, and insects from damaging the Work and infesting facility so Project will be free of pests and their residues at Substantial Completion. Obtain extended warranty for Owner. Perform control operations lawfully, using environmentally safe materials.
1. Use waste receptacles with close fitting lids for food and other organic wastes.

H. Pollution Control:
1. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
2. Follow pollution and environmental control requirements of authorities having jurisdiction.

1.21 WASTE REMOVAL

A. Collect and remove waste materials, debris, and rubbish from site weekly and dispose offsite.

B. Transport dusty and friable wastes through building in fully enclosed containers.

C. Open free fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

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D. Comply with requirements specified in Section 017419.

E. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300.

1.22 REMOVAL OF TEMPORARY FACILITIES AND CONTROLS

A. Remove temporary utilities, equipment, facilities, and materials, before Substantial Completion inspection.

B. Remove underground installations to minimum depth of 2 feet. Complete sitework as shown on Drawings.

C. Clean and repair damage caused by installation or use of temporary Work.
1. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 01 77 00.

D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

E. Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

F. Contractor to protect all existing site work, including but not limited to, concrete walkway, sidewalks, driveways, concrete, asphalt, trees, plants, grass and irrigation.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes.
1. General product requirements.
2. Product delivery.
3. Product storage and handling requirements.
4. Product selection.
5. Owner supplied products.
6. Equipment electrical characteristics and components.

1.2 GENERAL PRODUCT REQUIREMENTS

A. Supply products of new merchantable quality.

B. Supply products of each type from single manufacturer unless specified otherwise and regardless of how many subcontractors supply or install the product.
1. Where appearance attributes may vary between manufacturing lots, supply items from a single lot.

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C. Supply products complete with accessories, trim, fasteners, and other items needed for installation for indicated use and appearance.

D. Examine products before installation. Do not install damaged products.

E. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

F. Extra Materials:
1. Supply extra materials from same manufacturing lots as installed products.
2. Store extra materials in original packaging with intact labels. Mark packages with locations of installed products.
3. Store extra materials in building where directed by Owner.

1.3 PRODUCT DELIVERY

A. Transport and handle products per manufacturer instructions.

B. Deliver in original manufacturer packaging with intact labels and instructions.

C. Promptly inspect shipments to verify products follow requirements, quantities are correct, and products are undamaged.

1.4 PRODUCT STORAGE AND HANDLING

A. Store and protect products per manufacturer instructions.

B. Store products with seals and labels intact and legible.

C. Store products subject to water or temperature damage in weatherproof enclosures with environmental conditions within manufacturer recommendations.

D. Handle products to prevent soiling, disfigurement, or damage.

E. Exterior Storage:
   1. Store products off ground, sloped for drainage, and protected from soiling and staining.
   2. Cover products subject to moisture or UV deterioration and provide ventilation to allow condensation to dry.
   3. Store loose granular materials on solid surfaces and prevent mixing with foreign matter.
   4. Provide a secure location and enclosure at Project site for storage of materials and equipment.

F. Provide offsite storage and protection when site storage or protection is not practical.

G. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

1.5 PRODUCT SELECTION

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A. Products Specified by Reference Standards or by Descriptions Only: Any product meeting those standards or descriptions.

B. Products Specified by Naming Two or More Acceptable Products: Any named Product.

C. Products Specified by Naming One or More Manufacturers: Product of named manufacturer meeting specified requirements, no options or substitutions allowed unless specifically permitted.

D. Products Specified by Required Performance or Attributes Without Naming a Manufacturer or Product: Any product meeting specified requirements.

E. Basis of Design: Supply named product.
   1. Where specification sections state that comparable or equivalent products may be submitted for consideration, provide Product Data documenting equivalency to named product and compliance with specified requirements.
   2. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 for substitutions for convenience.

F. Compatibility: Where more than one choice is available for Contractor selection of products, select products that are compatible with other products, including products previously selected or installed.
   1. Total compatibility among Contractor options is not assured by limitations within Contract Documents, but must be provided by the Contractor.

G. Appearance Attributes: Unless specifically waived, request selection of colors, textures, patterns, or other appearance options from Architect for Products exposed to view in completed Work.

H. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

I. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product. Submit additional documentation required by Architect through Construction Manager in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by Architect, whose determination is final.

1.6 MANUFACTURER WARRANTIES

A. Write warranties for Owner benefit.

B. Warranty Period: See individual Specification sections.

C. Warranty Effective Date: Date of Substantial Completion or date of Product acceptance when after Substantial Completion.
   1. Comply with requirements in Section 017700.

D. Warranties specified in other Sections are to be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

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1.7 OWNER-SUPPLIED, CONTRACTOR-INSTALLED PRODUCTS

A. Owner Responsibilities:
   1. Provide Product Data, Shop Drawings, Samples, and other submittals to Contractor.
   2. Provide copies of manufacturer installation instructions, SDS and other safety information.
   3. Arrange and pay for delivery to site.
   4. Notify Contractor of scheduled delivery dates.
   5. Inspect delivered products jointly with Contractor.
   6. Submit claims for transportation damage, and replace damaged, defective, and missing items.
   7. Arrange for manufacturer warranties, inspections, and services.

B. Contractor Responsibilities:
   1. Designate scheduled delivery dates for Owner supplied products in construction progress schedule.
   2. Review Owner provided submittals for compatibility, installation, and use requirements. Notify Architect and Owner of issues that relate to coordination or scheduling.
   3. Receive, unload, handle, and store delivered products.
      a. Products Received at Project Site: Inspect jointly with Owner for completeness and damage.
      b. Products Received at Contractor Warehouse: Inspect for completeness and damage. Submit report of missing or damaged Products to Owner within two days of receipt. Transport Products to Project site and unload for installation.
   4. Protect Owner supplied products against loss and damage after receipt.
   5. Repair or replace items damaged after delivery.
   6. Install and otherwise incorporate Owner supplied products into the Work.

C. Products supplied by Owner for installation by Contractor:
   1. Furniture.

PART 2 PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Wiring Terminations: Supply terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Include lugs for terminal box.

B. Cord and Plug: Supply minimum 6 foot cord and plug with grounding connector for connection to electric wiring system. Cords of longer length are specified in individual specification sections.

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 70 00

EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Execution Requirements.
2. Field Engineering.
3. Cutting and Patching.
4. Progress cleaning.
5. Closeout procedures.
6. Systems Startup.
7. Demonstration and instruction.
8. Testing, adjusting, and balancing.
9. Protecting installed construction.
10. Project record documents.
11. Operation and maintenance data.
12. Manual for materials and finishes.
13. Manual for equipment and systems.
14. Spare parts and maintenance products.
15. Product warranties and product bonds.
16. Maintenance service.
17. Final cleaning.

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1.2 EXECUTION REQUIREMENTS

A. Examination:
1. Verify existing conditions are acceptable before starting subsequent Work.
2. Verify existing substrates can receive and support subsequent Work.
3. Examine and verify specific conditions described in individual specification sections.
4. Where possible, take field measurements before confirming product orders and beginning fabrication.
5. Verify utility services are available, correctly located, and correct characteristics.
6. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

B. Preparation:
1. Clean substrate surfaces before applying next material or substance.
2. Seal substrate cracks and openings before applying next material or substance.
3. Apply manufacturer required or recommended substrate primer, sealer, or conditioner before applying next material or substance.

C. General Installation Requirements:
   1. Follow manufacturer instructions and recommendations, applicable reference standards, and other requirements in individual specification sections.
   2. When manufacturer instructions conflict with Contract Documents, request clarification from Architect before proceeding.
   3. Make vertical elements plumb and horizontal elements level.
   4. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines.
   5. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or damage.
   6. Make consistent textures on surfaces, with seamless transitions.
   7. Make neat transitions between different surfaces, maintaining textures and appearances.
   8. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   9. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
   10. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

1.3 FIELD ENGINEERING

A. Licensed Professionals: Land Surveyor.

B. Locate survey control and reference points. Promptly notify Architect and Owner of discrepancies discovered.

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C. Protect survey control points before starting site work; preserve permanent reference points during construction.

D. Control Datum for Survey: Established by Owner provided survey.

E. Verify setbacks and easements; confirm drawing dimensions and elevations.

F. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

G. Submit copy of site drawing signed by Land Surveyor certifying elevations and locations of the Work conform with Contract Documents.

H. Maintain complete and accurate log of control and survey work as work progresses.

I. Promptly report to Architect loss or destruction of reference point or relocation required.

J. Replace dislocated survey control points based on original survey control. Do not make changes without notice to Architect.

1.4 CUTTING AND PATCHING

A. Whenever possible, execute the Work by methods that avoid cutting or patching.

B. Perform whatever cutting and patching is necessary to:
   1. Complete the Work.
   2. Fit products together to integrate with other elements.
   3. Provide openings for penetration of mechanical, electrical, and other services.
   4. Match Work that has been cut to adjacent Work.
   5. Repair areas adjacent to cuts to required condition.
   6. Repair new Work damaged by subsequent Work.
   7. Remove Samples of installed Work for testing when requested.
   8. Remove and replace defective and nonconforming Work.

C. Before cutting, examine existing conditions, including elements subject to damage or movement during cutting and patching.

D. Execute Work by methods that avoid damage to other Work and that will provide appropriate surfaces to receive patching and finishing. In existing Work, minimize damage and restore to original condition.

E. Employ experienced installers to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.

F. Cut rigid materials using masonry saw or core drill. Obtain Architect approval for pneumatic tools use.

G. Restore Work with new products in accordance with requirements of Contract Documents.

H. Fit Work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

I. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely firestop voids with tested firestop assemblies per Section 078400. Label firestopped penetrations per applicable code.

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J. Patching:
   1. Finish patched surfaces to match finish color, texture, and appearance that existed before patching.
      a. Continuous Surfaces: Refinish to nearest intersection or natural break.
      b. Assemblies: Refinish entire unit.
   2. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching Work. If defects are due to substrate condition substrate, repair substrate before repairing finish.

1.5 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Remove debris and rubbish from pipe chases and plenums before enclosing spaces.

C. Broom and vacuum clean interior areas before starting surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, trash, and rubbish from site periodically and dispose offsite; do not burn or bury.

1.6 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect review.
   1. If Architect performs reinspections due to failure of Work to comply with claims of status of completion made by Contractor, Owner will compensate Architect for such additional services and will deduct the amount of such compensation from final payment to Contractor.

B. Provide submittals to Architect required by authorities having jurisdiction.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and sum remaining due.

D. Closeout Submittals:
   1. Evidence of compliance with requirements of governing authorities.
   2. Certificate of Occupancy.
   3. Project Record Documents.
   4. Operation and Maintenance Data.
   5. Warranties.
   6. Keys and keying schedule.
   7. Spare parts and maintenance products.
   8. Evidence of payment to Subcontractors and suppliers.
   9. Final lien waiver.
   10. Certificates of insurance for products and completed operations.
   11. Consent of Surety to final payment.

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1.7 SYSTEMS STARTUP

A. Coordinate schedule for startup of various equipment and systems.

B. Notify Architect and Owner seven days before starting each system.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

D. Verify that tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute startup under supervision of applicable manufacturer representative per manufacturer instructions.

G. Where specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation before startup, and to supervise placing equipment or system in operation.

1.8 DEMONSTRATION AND INSTRUCTION

A. Demonstrate operation and maintenance of products to Owner personnel 15 days before inspection for Substantial Completion.

B. Demonstrate Project equipment and instruct by qualified instructor who is knowledgeable about the Project.

C. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

D. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner personnel in detail to explain all aspects of operation and maintenance.

E. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, shutdown, and emergency procedures for each item of equipment.

F. Prepare and insert additional data in operations and maintenance manuals when need for additional information becomes apparent during instruction.

G. Required instruction time for each item of equipment and system is specified in individual sections.

1.9 TESTING, ADJUSTING, AND BALANCING

A. Owner will employ and pay for services of independent firm to perform testing, adjusting, and balancing.

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B. Reports will be submitted by independent firm to Architect, Owner, and Contractor indicating observations and results of tests and indicating compliance or noncompliance with requirements of Contract Documents.

1.10 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activities in immediate work areas to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects with durable sheet materials or panels.

E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

F. Prohibit traffic on landscaped areas.

1.11 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents for recording revisions to the Work and locations of concealed work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other Contract Modifications.
   5. Reviewed Product Data, Shop Drawings, and Samples.
   6. Manufacturer instructions for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress, but not less than weekly.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following data:
   1. Manufacturer names and models and numbers for installed products.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and Modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including following data.
   1. Measured depths of foundations in relation to finish ground floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
      a. Record and check the markup before enclosing concealed installations.
   4. Field changes of dimension and detail.
   5. Details not on original Contract Drawings.

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G. Electronic Project Website Files: Submit archive of electronic files from project website to Construction Manager in digital format acceptable to Owner.

H. Coordination Model: Provide digital data files of coordination model for use by Owner.

I. Submit documents to Construction Manager with final application for payment.

1.12 OPERATION AND MAINTENANCE DATA

A. Electronic File Manuals: Submit manuals as composite electronic PDF file for each manual type.
   1. Arrange files by system and subsystem with bookmarks and bookmarks for individual document files.
   2. Include drawing files appropriate to content.

B. Table of Contents:
   1. Part 1: Directory listing names, addresses, and telephone numbers of Architect and its consultants, Owner consultants, Contractor, subcontractors, and major equipment suppliers.

2. Part 2: Operation and maintenance instructions arranged by system and subdivided by Specification section. For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Include the following information:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
3. Part 3: Project documents and certificates, including the following:
   a. Record Shop Drawings and Product Data.
   b. Test and balance reports.
   c. Certificates.
   d. Warranty copy.
   e. Bond copy.

1.13 MANUAL FOR MATERIALS AND FINISHES

A. Submit electronic PDF files of proposed format and outline of contents before start of Work. Architect and Construction Manager will review draft and return annotated PDF file with comments.
   1. Include listing in Table of Contents for design data with space for insertion of data.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

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C. Submit electronic PDF files of completed manuals 15 days before final inspection. Draft copy will be reviewed and returned with Architect comments after final inspection. Revise content of document sets as required by review comments before final submission.

D. Submit electronic PDF files in final form within 10 days after final inspection.

E. Building Products, Applied Materials, and Finishes: Include record Product Data, with catalog number, size, composition, and color and texture designations.
   1. Include information for reordering custom manufactured products.

F. Instructions for Care and Maintenance: Include manufacturer recommendations for cleaning products and methods, precautions against detrimental cleaning products and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.

H. Additional Requirements: Specified in individual specification sections.

1.14 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit electronic PDF files of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return annotated PDF file with comments.

B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within ten days after acceptance.

C. Submit electronic PDF files of completed manuals 15 days before final inspection. Draft copy will be reviewed and returned with Architect comments after final inspection. Revise content of document sets as required by review comments before final submission.

D. Submit electronic PDF files in final form within 10 days after final inspection.

E. Each Item of Equipment and Each System:
   1. Include description of unit or system, and component parts.
   2. Identify function, normal operating characteristics, and limiting conditions.
   3. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.

F. Panelboard Circuit Directories: Provide printed electrical service characteristics, controls, and communications.

G. Include color coded wiring diagrams as installed.

H. Operating Procedures:
   1. Include startup, break-in, and routine normal operating instructions and sequences.
   2. Include regulation, control, stopping, shutdown, and emergency instructions.
   3. Include seasonal and special operating instructions.

I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

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J. Include servicing and lubrication schedule, and list of lubricants required.

K. Include manufacturer printed operation and maintenance instructions.

L. Include sequence of operation by controls manufacturer.

M. Include original manufacturer parts list, illustrations, assembly drawings, and diagrams required for maintenance.

N. Include control diagrams by controls manufacturer as installed.

O. Include Contractor coordination drawings, with color coded piping diagrams as installed.

P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

Q. Include list of original manufacturer spare parts, current prices, and recommended quantities to be maintained in storage.

R. Additional Requirements: As specified in individual product specification sections.

S. Include listing in Table of Contents for design data with space for insertion of data.

1.15 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Supply spare parts, maintenance, and extra products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed by Owner; obtain receipt before final payment.

1.16 PRODUCT WARRANTIES

A. Obtain warranties from responsible subcontractors, suppliers, and manufacturers within 10 days after completion of applicable item of Work.

B. Include copies of standard manufacturer warranties that do not require execution.

C. Execute and assemble transferable warranty documents from subcontractors, suppliers, and manufacturers.

D. Verify documents are in proper form, contain full information, and, where signed, are notarized.

E. Assemble product warranties in loose leaf notebook with table of contents.
   1. Scan warranties and submit as composite PDF file with table of contents and bookmarks for Specification sections.
   2. Arrange warranties by Specification section.

F. Submit warranties before final Application for Payment.

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G. Time of Submittals:
   1. For equipment or component parts of equipment put into service during construction with Owner permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion and before final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing date of acceptance as beginning of warranty period.

1.17 FINAL CLEANING

A. Perform final cleaning before inspection for Substantial Completion.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces, damp mop hard surface flooring.

C. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

D. Replace operating equipment filters.

E. Clean debris from roofs and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from site.

PART 2 PRODUCTS

2.1 PATCHING MATERIALS

A. New Materials: Specified in product sections; match existing products and Work for patching and extending Work.

B. Existing Products: Determine type and quality by inspection and testing. Refer to existing as work results standard.

PART 3 EXECUTION - NOT USED

END OF SECTION

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SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Construction waste management plan.
2. Construction waste recycling.
3. Construction waste adaptive reuse.

1.2 INFORMATIONAL SUBMITTALS

A. Construction Waste Management Plan: Submit plan describing implementation and compliance monitoring including:
1. Construction waste hauling company.
2. Landfill facility.
3. Recycling and adaptive reuse processing facilities. Indicate waste type facilities will accept.
4. Construction waste materials anticipated for recycling and adaptive reuse.
5. On site sorting and site storage methods.

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B. Substantiation Report: Submit report before Substantial Completion. Show construction waste management plan compliance status.
1. Trash: Quantity by weight deposited in landfills. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal.
2. Salvaged Material: Quantity by weight with destination for each material salvaged for resale, recycling, or adaptive reuse. Include associated fees, transportation costs, container rentals, and taxes for total cost of disposal. Also include reimbursements from salvage resale.
3. Total Cost: Indicate total cost or savings for construction waste management plan.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Submit report indicating diverted waste quantity, total waste quantity and percentage of waste diverted from landfills.
1. Include tipping tickets from landfill and recycling facility showing material quantity disposed.

1.4 CONSTRUCTION WASTE MANAGEMENT PLAN

A. Develop and implement construction waste management plan to divert 75 percent of construction waste from landfills and as required by the jurisdictions having authority over the project work. .
1. Divert construction and demolition waste from landfill disposal.
2. Redirect recyclable material back to manufacturing process.
3. Calculate cost savings to Project for waste disposal.

B. Implement construction waste management plan at start of construction.

C. Review construction waste management plan at preconstruction meeting and progress meetings.

D. Distribute approved construction waste management plan to affected parties.

E. Oversee plan implementation, instruct construction personnel for plan compliance, and document plan results.

F. Purchase products to minimize waste.
1. Ensure correct quantity is delivered to site.
2. Choose products with minimal or no packaging.
3. Require returnable pallets and containers.
4. Require suppliers to take or buy back rejected and unused items.

1.5 CONSTRUCTION WASTE RECYCLING

A. Use source separation method or co-mingling method suitable to sorting and processing method of selected recycling center.

B. Separate recyclable materials from trash. Dispose trash separately into landfill.

C. Source Separation Method: Sort recyclable materials into separate bins by waste type, before transporting to recycling center.

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D. Co-Mingling Method: Place recyclable materials in bins for sorting at recycling center.

E. Materials designated for recycling:
1. Packing materials including paper, cardboard, foam plastic, and sheeting.
2. Recyclable plastics.
3. Organic plant debris.
4. Earth materials.
5. Natural stone and granular fill.
6. Asphalt and concrete paving.
7. Wood.
8. Glass.
9. Metals.
10. Gypsum board.
11. Acoustic ceiling panels.
12. Carpet.
13. Masonry.
14. Piping and conduit.
15. Lamps.

1.6 CONSTRUCTION WASTE ADAPTIVE REUSE

A. Arrange with adaptive reuse processing facility for construction waste processing for reuse.

B. Materials designated for adaptive reuse:
1. Concrete and crushed concrete.

2. Masonry units.
3. Lumber suitable for resawing or refinishing.
4. Casework and millwork.
5. Doors and door frames.
6. Windows.
7. Window glass and insulating glass units.
8. Hardware.
9. Acoustical ceiling panels.
10. Equipment and appliances.
11. Fluorescent light fixtures and lamps.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.1 CONSTRUCTION WASTE COLLECTION

A. Hazardous Waste: Hazardous waste may exist on the project site. Refer to Section 011000 Summary for information.

B. Collect construction waste and arrange for transportation to recycling centers or adaptive reuse processing facilities.

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C. Maintain construction waste storage and collection area in orderly manner. Prevent co-mingling of trash, recyclable, and reusable materials.

D. Store construction waste to prevent environmental pollution, fire hazards, hazards to persons and property, and contamination.

E. Cover construction waste to prevent loss and degradation.

3.2 RECYCLING DEMOLITION WASTE

A. Fluorescent Fixtures and Lamps:
1. Handle fluorescent fixtures and lamps with care. Prevent fluorescent lamp breakage.
2. Carefully remove fluorescent lamps from fixtures before removing fixtures.
3. Package fluorescent lamps to protect lamps from breakage during storage and shipment.
4. Dispose of lamps at recycling center specifically qualified to recycle fluorescent lamps.

3.3 CONSTRUCTION WASTE DISPOSAL

A. Deliver construction waste to waste processing facilities. Obtain receipt for deliveries.

B. Dispose construction waste not capable of being recycled or adaptively reused by delivery to landfill, incinerator, or other legal disposal facility. Obtain receipts for deliveries.

END OF SECTION

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SECTION 02 40 00 - DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. Removing above-grade site improvements within limits indicated.

B. Disconnecting, capping, or sealing, and abandoning site utilities in place.

C. Disconnecting, capping, or sealing, and removing site utilities.

D. Dust Alleviation and Control.

E. Disposing of objectionable material.

1.2 RELATED SECTIONS

A. Section 31 1100 – Clearing and Grubbing

1.3 RELATED DOCUMENTS

A. California Building Code: Chapter 33 – Site Work, Demolition and Construction.

B. Construction Management Plan prepared by _____.

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1.4 DEFINITIONS

A. ANSI: American National Standards Institute.

B. CAL-OSHA: California Occupational Safety and Health Administration.

1.5 SUBMITTALS

A. Follow Submittal procedure outlined in the Division 1 Specifications.

1.6 PROJECT CONDITIONS

A. Except for materials indicated to be stockpiled or to remain the Owner's property, cleared materials are the Contractor's property. Remove cleared materials from site and dispose of in lawful manner.

B. Salvable Improvements: Carefully remove items indicated to be salvaged and store where indicated on plans or where designated by the Owner. Avoid damaging materials designated for salvage.

C. Unidentified Materials: If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the Owner. If necessary, the Owner will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

D. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

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PART 2 – PRODUCTS

2.01 SOIL MATERIALS

A. On-site soils with an organic content less than 3 percent by weight may be reused as general fill.

B. Imported soil and non-expansive material should be inorganic with a plasticity index of 15 or less. Import soil material must be approved by the Geotechnical Engineer.

PART 3 – EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points during construction.

B. Protect existing site improvements to remain during construction.

3.2 RESTORATION

A. Restore damaged improvements to their original condition, as acceptable to the Owner.

3.3 UTILITIES

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed or abandoned. Prior to demolition, contact Underground Service Alert.

B. Arrange to shut off indicated utilities with utility companies or verify that utilities have been shut off.

C. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless authorized in writing by the Owner, and then only after arranging to provide temporary utility services according to requirements indicated.

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D. Coordinate utility interruptions with utility company affected.

E. Do not proceed with utility interruptions without the permission of the Owner and utility company affected. Notify Owner and utility company affected two working days prior to utility interruptions.

F. Excavate and remove underground utilities that are indicated to be removed.

G. Securely close ends of abandoned piping with tight fitting plug or wall of concrete minimum 6-inches thick.

3.4 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, and gutters, as indicated. Where concrete slabs, curb, gutter and asphalt pavements are designated to be removed, remove bases and subbase to surface of underlying, undisturbed soil.

C. Unless the existing full-depth joints coincide with line of pavement demolition, neatly saw-cut to full depth the length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

D. Remove driveways, curbs, gutters and sidewalks by saw cutting to full depth. If saw cut falls within 30-inches of a construction joint, expansions joint, score mark or edge, remove material to joint, mark or edge.

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3.5 BACKFILL

A. Place and compact material in excavations and depressions remaining after site clearing in conformance with Section 31 2333 – Trenching and Backfill.

3.6 DISPOSAL

A. Remove surplus obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

3.7 DUST ALLEVIATION AND CONTROL

A. Contractor shall be responsible for and shall provide pollution and dust abatement and control measures satisfactorily during the course of the work.

B. Water used should be the minimum necessary for dust control. Contractor is responsible for supplying all water for construction and dust control.

3.8 FINISH OPERATIONS AND DISPOSAL

A. Remove surplus obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off the Owner's property.

B. Surplus materials and construction debris remaining upon completion of the work shall become the property of the Contractor unless otherwise specified herein or noted on the plans and shall be removed from the work site by the Contractor and disposed of off-site in a lawful manner.

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END OF SECTION 02 40 00

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Selective demolition.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
   1. Coordinate work of this section with work to be salvaged or preserved.

B. Coordinate utility and building service interruptions with Owner.
   1. Notify Owner seven days, minimum, before disrupting building fire protection and life safety systems.
   2. Schedule tie ins to existing systems to minimize disruption.
   3. Coordinate Work so fire protection and life safety systems remain continuously operational in occupied areas.

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C. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.
   2. Additional Agenda Items:
      a. Review structural load limitations of existing structure.
      b. Review areas of existing to remain construction that requires protection.

D. Owner will conduct salvage operations before demolition begins to remove materials Owner chooses to retain.

E. Perform noisy, malodorous, and dusty Work:
   1. Between hours of 9 am and 4 pm.
   2. On following days: Weekdays.

F. Cooperate with Owner in scheduling noisy operations and waste removal that may impact Owner operation and occupancy of adjoining spaces.

1.3 ACTION SUBMITTALS

A. Shop Drawings:
   1. Indicate demolition and removal sequence.
   2. Indicate location of items designated for reuse or Owner retention.
   3. Indicate location and construction of temporary partitions.

B. Demolition Schedule: Indicate overall schedule and interruptions required for utility and building services.

1.4 INFORMATIONAL SUBMITTALS

A. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and demolition operations. Comply with Section 01 32 00 "Photographic Documentation." Submit before Work begins.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Accurately record actual locations of capped utilities, concealed utilities discovered during demolition, and subsurface obstructions.

1.6 FIELD CONDITIONS

A. Conduct demolition to minimize interference with adjacent areas.

B. Cease operations immediately if structure appears to be in danger and notify Owner and Architect. Do not resume operations until directed.

PART 2 PRODUCTS - NOT USED

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PART 3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Follow the following reference standards:
1. ANSI/ASSP A10.6.
2. NFPA 241.

B. Follow applicable code for demolition Work, dust control, and for products requiring utility disconnection and reconnection.

C. Notify Owner and Architect if suspected hazardous or contaminated materials are discovered.

D. Obtain required permits from authorities having jurisdiction.

E. Perform Work in accordance with State and Municipality of Lakewood standard.

3.2 PREPARATION

A. Notify affected utility companies before starting Work; follow their requirements.

B. Mark location and termination of utilities.

C. Erect, and maintain temporary barriers and security devices at locations shown, including warning signs and lights, and similar measures, for protection of the public, the Owner, and existing improvements indicated to remain.

D. Erect and maintain weatherproof closures for exterior openings.

E. Erect and maintain temporary partitions to prevent spread of dust, odors, and noise to permit continued Owner occupancy.

F. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.

G. Provide appropriate temporary signage including signage for exit or building egress.

H. Do not close or obstruct building egress paths.

3.3 SALVAGE REQUIREMENTS

A. Coordinate with Owner to identify building components and equipment required to be removed and delivered to Owner.

B. Tag components and equipment Owner designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

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E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Owner. Obtain signed receipt from Owner.

3.4 DEMOLITION

A. Conduct demolition to minimize interference with adjacent occupied or unaffected building areas.

B. Maintain protected egress from and access to adjacent existing buildings at all times.

C. Do not close or obstruct roadways and sidewalks without permits.

D. Disconnect and remove designated utilities within demolition areas.

E. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.

F. Demolish in orderly and careful manner. Protect existing improvements supporting structural members.

G. Carefully remove building components indicated to be reused.
   1. Disassemble components as required to permit removal.
   2. Package small and loose parts to avoid loss.
   3. Mark components and packaged parts to permit reinstallation.
   4. Store components, protected from construction operations, until reinstalled.

H. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

I. Transport friable and dusty demolished materials through building in enclosed containers.

J. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

K. Remove temporary partitions.

END OF SECTION

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DIVISION 3 – CAST-IN-PLACE CONCRETE

SECTION 03 30 00

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings / Foundations.
2. Foundation walls.
3. Slabs-on-grade.
4. Suspended slabs.
5. Concrete toppings.
6. Building frame members.
7. Building walls.

B. Related Sections:

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1. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
2. Section 035300 "Concrete Topping" for emery- and iron-aggregate concrete floor toppings.
3. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
4. Section 321313 "Concrete Paving" for concrete pavement and walks.
5. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

2. Product Data for Credit IEQ 4.3: For liquid floor treatments and curing and sealing compounds, documentation including printed statement of VOC content.
3. Design Mixtures for Credit ID 1.1: For each concrete mixture containing fly ash as a replacement for portland cement or other portland cement replacements, and for equivalent concrete mixtures that do not contain portland cement replacements.

C. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

D. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

2. For multi-story construction, submit calculations stamped by a licensed engineer in the state where the Project is located.

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F. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect and Structural Engineer.

G. Samples: For waterstops, vapor retarder.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.

9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

D. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates.

E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.

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B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

E. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M, "Structural Welding Code - Reinforcing Steel."

F. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."

G. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests.

H. Mockups: Cast concrete slab-on-grade and formed-surface panels to demonstrate typical joints, surface finish, texture, tolerances, floor treatments, and standard of workmanship.

1. Build panel approximately 200 sq. ft. for slab-on-grade and 100 sq. ft. for formed surface in the location indicated or, if not indicated, as directed by Architect.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

I. Preinstallation Conference: Conduct conference at Project site.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency.
c. Ready-mix concrete manufacturer.
d. Concrete subcontractor.
e. Special concrete finish subcontractor.
f. Owner representative.
g. Structural Engineer

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2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations, shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage. Avoid damaging coatings on steel reinforcement, if applicable.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

    a. High-density overlay, Class 1 or better.
    b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    c. Structural 1, B-B or better; mill oiled and edge sealed.
    d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

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D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that will leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, will leave holes no larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.2 STEEL REINFORCEMENT

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.

B. Reinforcement: Reference structural drawings general notes for materials requirements.

2.3 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A 615, Grade 60, plain-steel bars, ASTM A 775 epoxy coated.

C. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775.

D. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

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E. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.4 CONCRETE MATERIALS

A. Cementitious Materials: Conform to the structural drawings general notes requirements.

B. Normal-Weight Aggregates: Conform to ASTM C33 and the structural drawings general notes requirements.

C. Water: ASTM C 94 and potable.

2.5 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

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a. Axim Italcementi Group, Inc.; CATEXOL CN-CI.
b. BASF Construction Chemicals - Building Systems; Rheocrete CNI.
c. Euclid Chemical Company (The), an RPM company; [ARRMATECT] [EUCON BCN] [EUCON CIA].
d. Grace Construction Products, W. R. Grace & Co.; DCI.
e. Sika Corporation; Sika CNI.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; Rheocrete 222+.
b. Cortec Corporation; MCI- [2000] [2005NS].
c. Grace Construction Products, W. R. Grace & Co.; DCI-S.
d. Sika Corporation; FerroGard 901.

E. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. ChemMasters.
b. Davis Colors.
c. Dayton Superior Corporation.
d. Hoover Color Corporation.
e. Lambert Corporation.
f. QC Construction Products.
g. Rockwood Pigments NA, Inc.
h. Scofield, L. M. Company.
i. Solomon Colors, Inc.

2. Color: As selected by Architect from manufacturer's full range.

2.6 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Greenstreak.
b. Williams Products, Inc.

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2. Profile: Flat, dumbbell with center bulb, unless noted otherwise by architectural drawings.
3. Dimensions: 6 inches by 3/8 inch thick; nontapered, unless noted otherwise by architectural drawings.

B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. JP Specialties, Inc.; Earth Shield TPE-Rubber.
b. Vinylex Corp.; PetroStop.
c. WESTEC Barrier Technologies, Inc.; 600 Series TPE-R.

2. Profile: Flat, dumbbell with center bulb, unless noted otherwise by architectural drawings.
3. Dimensions: 6 inches by 3/8 inch thick; nontapered, unless noted otherwise by architectural drawings.

C. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. BoMetals, Inc.
b. Greenstreak.
c. Paul Murphy Plastics Company.
d. Vinylex Corp.

2. Profile: Flat, dumbbell with center bulb, unless noted otherwise by architectural drawings.
3. Dimensions: 6 inches by 3/8 inch thick; nontapered, unless noted otherwise by architectural drawings.

D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

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a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP.
b. CETCO; Volclay Waterstop-RX.
c. Concrete Sealants Inc.; Conseal CS-231.
d. Greenstreak; Swellstop.
e. Henry Company, Sealants Division; Hydro-Flex.
f. JP Specialties, Inc.; Earth Shield Type 20.

E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Adeka Ultra Seal/OCM, Inc.; Adeka Ultra Seal.
b. Greenstreak; Hydrotite.
c. Vinylex Corp.; Swellseal.

2.7 VAPOR RETARDERS

A. Sheet Vapor Retarder: ASTM E 1745, Class A. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Carlisle Coatings & Waterproofing, Inc.; Blackline 400.
    b. Fortifiber Building Systems Group; Moistop Ultra 15.
    c. Grace Construction Products, W. R. Grace & Co.; Florprufe 120.
    d. Insulation Solutions, Inc.; Viper VaporCheck 16.
    e. Meadows, W. R., Inc.; Perminator 15 mil.
    f. Raven Industries Inc.; Vapor Block 15.
    g. Reef Industries, Inc.; Griffolyn Type-65G or 15 mil Green.
    h. Stego Industries, LLC; Stego Wrap 15 mil Class A.

B. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.

C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch sieve, 10 to 30 percent passing a No. 100 sieve, and at least 5 percent passing No. 200 sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

2.8 FLOOR AND SLAB TREATMENTS

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A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing No. 8 sieve.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Anti-Hydro International, Inc.; Emery.
    b. Dayton Superior Corporation; Emery Tuff Non-Slip.
    c. Lambert Corporation; EMAG-20.
    d. L&M Construction Chemicals, Inc.; Grip It.
    e. Metalcrete Industries; Metco Anti-Skid Aggregate.

B. Slip-Resistive Aluminum Granule Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of not less than 95 percent fused aluminum-oxide granules.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Anti-Hydro International, Inc.; A-H Alox.
    b. BASF Construction Chemicals - Building Systems; Frictex NS.
    c. L&M Construction Chemicals, Inc.; Grip It AO.

C. Emery Dry-Shake Floor Hardener: Pigmented, factory-packaged, dry combination of portland cement, graded emery aggregate, and plasticizing admixture; with emery aggregate consisting of no less than 60 percent of total aggregate content.

1. Color: As selected by Architect from manufacturer's full range.

D. Metallic Dry-Shake Floor Hardener: Pigmented, factory-packaged, dry combination of portland cement, graded metallic aggregate, rust inhibitors, and plasticizing admixture; with metallic aggregate consisting of no less than 65 percent of total aggregate content.

1. Color: As selected by Architect from manufacturer's full range.

E. Unpigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, and plasticizing admixture.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; Maximent.
b. ChemMasters; ConColor.
c. Conspec by Dayton Superior; Conshake 500.
d. Dayton Superior Corporation; Quartz Tuff.
e. Edoco by Dayton Superior; Burke Non Metallic Floor Hardener 250.
f. Euclid Chemical Company (The), an RPM company; Surflex.
g. Kaufman Products, Inc.; Tycron.
h. Lambert Corporation; Colorhard.
i. L&M Construction Chemicals, Inc.; Quartzplate FF.
j. Metalcrete Industries; Floor Quartz.
k. Scofield, L. M. Company; Lithochrome Color Hardener.
l. Symons by Dayton Superior; Hard Top.

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F. Pigmented Mineral Dry-Shake Floor Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; Mastercron.
b. ChemMasters; ConColor.
c. Conspec by Dayton Superior; Conshake 600 Colortone.
d. Dayton Superior Corporation; Quartz Tuff.
e. Edoco by Dayton Superior; Burke Non Metallic Floor Hardener 200 - 205.
f. Euclid Chemical Company (The), an RPM company; Surflex.
g. Kaufman Products, Inc.; Tycron.
h. Lambert Corporation; Colorhard.
i. L&M Construction Chemicals, Inc.; Quartz Plate FF.
j. Metalcrete Industries; Floor Quartz.
k. Scofield, L. M. Company; Lithochrome Color Hardener.
l. Symons by Dayton Superior; Color Hardener.

2. Color: As selected by Architect from manufacturer's full range.

2.9 LIQUID FLOOR TREATMENTS

A. VOC Content: Liquid floor treatments shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ChemMasters; Chemisil Plus.
b. ChemTec Int'l; ChemTec One.
c. Conspec by Dayton Superior; Intraseal.
d. Curecrete Distribution Inc.; Ashford Formula.
e. Dayton Superior Corporation; Day-Chem Sure Hard (J-17).
f. Edoco by Dayton Superior; Titan Hard.
g. Euclid Chemical Company (The), an RPM company; Euco Diamond Hard.
h. Kaufman Products, Inc.; SureHard.
i. L&M Construction Chemicals, Inc.; Seal Hard.
j. Meadows, W. R., Inc.; LIQUI-HARD.
k. Metalcrete Industries; Floorsaver.
l. Nox-Crete Products Group; Duro-Nox.
m. Symons by Dayton Superior; Buff Hard.
n. US SPEC, Division of US Mix Products Company; US SPEC Industraseal.
o. Vexcon Chemicals, Inc.; Vexcon StarSeal PS Clear.

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C. Penetrating Liquid Floor Treatments for Polished Concrete Finish: Clear, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and is suitable for polished concrete surfaces.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Advanced Floor Products; Retro-Plate 99.
b. L&M Construction Chemicals, Inc.; FGS Hardener Plus.
c. QuestMark, a division of CentiMark Corporation; DiamondQuest Densifying Impregnator Application.

2.10 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Axim Italcementi Group, Inc.; CATEXOL CimFilm.
    b. BASF Construction Chemicals - Building Systems; Confilm.
    c. ChemMasters; SprayFilm.
    d. Conspec by Dayton Superior; Aquafilm.
    e. Dayton Superior Corporation; Sure Film (J-74).
    f. Edoco by Dayton Superior; BurkeFilm.
    g. Euclid Chemical Company (The), an RPM company; Eucobar.
    h. Kaufman Products, Inc.; Vapor-Aid.
    i. Lambert Corporation; LAMBCO Skin.
    j. L&M Construction Chemicals, Inc.; E-CON.
    k. Meadows, W. R., Inc.; EVAPRE.
    l. Metalcrete Industries; Waterhold.
    m. Nox-Crete Products Group; MONOFILM.
    n. Sika Corporation; SikaFilm.
    o. SpecChem, LLC; Spec Film.
    p. Symons by Dayton Superior; Finishing Aid.
    q. TK Products, Division of Sierra Corporation; TK-2120 TRI-FILM.
    r. Unitex; PRO-FILM.
    s. Vexcon Chemicals, Inc.; Certi-Vex Envio Set.

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B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. Anti-Hydro International, Inc.; AH Curing Compound #2 DR WB.
    b. BASF Construction Chemicals - Building Systems; Kure 200.
    c. ChemMasters; Safe-Cure Clear.
    d. Conspec by Dayton Superior; W.B. Resin Cure.
    e. Dayton Superior Corporation; Day-Chem Rez Cure (J-11-W).
    f. Edoco by Dayton Superior; Res X Cure WB.
    g. Euclid Chemical Company (The), an RPM company; Kurez W VOX; TAMMSCURE WB 30C.
    h. Kaufman Products, Inc.; Thinfilm 420.
    i. Lambert Corporation; AQUA KURE - CLEAR.
    j. L&M Construction Chemicals, Inc.; L&M Cure R.
    k. Meadows, W. R., Inc.; 1100-CLEAR.

l. Nox-Crete Products Group; Resin Cure E.
m. Right Pointe; Clear Water Resin.
n. SpecChem, LLC; Spec Rez Clear.
o. Symons by Dayton Superior; Resi-Chem Clear.
p. TK Products, Division of Sierra Corporation; TK-2519 DC WB.
q. Vexcon Chemicals, Inc.; Certi-Vex Enviocure 100.

2. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Construction Chemicals - Building Systems; Kure 1315.
b. ChemMasters; Polyseal WB.
c. Conspec by Dayton Superior; Sealcure 1315 WB.
d. Edoco by Dayton Superior; Cureseal 1315 WB.
e. Euclid Chemical Company (The), an RPM company; Super Diamond Clear VOX; LusterSeal WB 300.
f. Kaufman Products, Inc.; Sure Cure 25 Emulsion.
g. Lambert Corporation; UV Safe Seal.
h. L&M Construction Chemicals, Inc.; Lumiseal WB Plus.
i. Meadows, W. R., Inc.; Vocomp-30.
j. Metalcrete Industries; Metcure 30.
k. Right Pointe; Right Sheen WB30.
l. Symons by Dayton Superior; Cure & Seal 31 Percent E.
m. Vexcon Chemicals, Inc.; Vexcon Starseal 1315.

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2. VOC Content: Curing and sealing compounds shall have a VOC content of 200 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing or Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete, as required for repair procedure.

E. Reglets: Fabricate reglets of not less than 0.022-inch-thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch-thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 28 day strength of concrete to be repaired when tested according to ASTM C 109.

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B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 28 day strength of concrete to be repaired when tested according to ASTM C 109.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301.

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials: Conform to structural drawings general notes requirements.

C. Water-soluble, chloride-ion content in hardened concrete to conform to structural drawings general notes requirements.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture as required in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

E. Color Pigment: If applicable, add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Proportion concrete mixtures in accordance with the structural drawings general notes requirements.

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2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94**,** and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117, or stricter if required by the structural drawings or construction sequencing.

C. Limit concrete surface irregularities, designated by ACI 347 as abrupt or gradual, as follows:

1. Class A, 1/8 inch for smooth-formed finished surfaces.
2. Class B, 1/4 inch for rough-formed finished surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

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F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

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B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORES AND RESHORES

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR RETARDERS

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.

B. Granular Course: For concrete slabs on grade without floor finishes, cover vapor retarder with granular fill material, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch or minus 3/4 inch.

1. Place and compact a 1/2-inch-thick layer of fine-graded granular material over granular fill.

3.6 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that would reduce bond to concrete.

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C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4, only where indicated in structural drawings.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect and structural engineer.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in basement/perimeter walls at maximum 20 feet on center spacing. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

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D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by structural engineer.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

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D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.

5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

G. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

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3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces not exposed to public view.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

1. Apply to concrete surfaces exposed to public view, to receive a rubbed finish, to be covered with a coating or covering material applied directly to concrete.

C. Rubbed Finish: Apply the following to smooth-formed finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform

color and texture. Do not apply cement grout other than that created by the rubbing process.

2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part portland cement to one and one-half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix one part portland cement and one part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

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B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch in one direction.

1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.

C. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces indicated to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

D. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces indicated, exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
2. Finish surfaces to the following tolerances, according to ASTM E 1155, for a randomly trafficked floor surface:

a. Specified overall values of flatness, F(F) 30; and of levelness, F(L) 20; with minimum local values of flatness, F(F) 24; and of levelness, F(L) 15; for slabs-on-grade.
b. Specified overall values of flatness, F(F) 30; with minimum local values of flatness, F(F) 24; for suspended slabs.

E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.

1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

F. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and elsewhere as indicated.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

G. Slip-Resistive Finish: Before final floating, apply slip-resistive aluminum granule finish where indicated and to concrete stair treads, platforms, and ramps. Apply according to manufacturer's written instructions and as follows:

1. Uniformly spread 25 lb/100 sq. ft. of dampened slip-resistive aluminum granules over surface in one or two applications. Tamp aggregate flush with surface, but do not force below surface.
2. After broadcasting and tamping, apply float finish.
3. After curing, lightly work surface with a steel wire brush or an abrasive stone and water to expose slip-resistive aluminum granules.

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H. Dry-Shake Floor Hardener Finish: After initial floating, apply dry-shake floor hardener to surfaces according to manufacturer's written instructions and as follows:

1. Uniformly apply dry-shake floor hardener at a rate of 100 lb/100 sq. ft. unless greater amount is recommended by manufacturer.
2. Uniformly distribute approximately two-thirds of dry-shake floor hardener over surface by hand or with mechanical spreader, and embed by power floating. Follow power floating with a second dry-shake floor hardener application, uniformly distributing remainder of material, and embed by power floating.
3. After final floating, apply a trowel finish. Cure concrete with curing compound recommended by dry-shake floor hardener manufacturer and apply immediately after final finishing.

3.12 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

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C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.
c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound will not interfere with bonding of floor covering used on Project.

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 LIQUID FLOOR TREATMENTS

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A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than 28 days old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Polished Concrete Floor Treatment: Apply polished concrete finish system to cured and prepared slabs to match accepted mockup.

1. Machine grind floor surfaces to receive polished finishes level and smooth.
2. Apply penetrating liquid floor treatment for polished concrete in polishing sequence and according to manufacturer's written instructions, allowing recommended drying time between successive coats.
3. Continue polishing with progressively finer grit diamond polishing pads to gloss level to match approved mockup.
4. Control and dispose of waste products produced by grinding and polishing operations.
5. Neutralize and clean polished floor surfaces.

C. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

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1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.

3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
7. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

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E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing and Inspecting: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs.
4. Verification of use of required design mixture.
5. Concrete placement, including conveying and depositing.
6. Curing procedures and maintenance of curing temperature.
7. Verification of concrete strength before removal of shores and forms from beams and slabs.

8. Formwork dimensions.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:

1. Testing Frequency: Samples for strength tests of each concrete mixture placed each day shall be taken not less than once a day, nor less than once for each 150 cu. yd. of concrete.

    a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each composite sample.
5. Compression Test Specimens: ASTM C 31.

    a. Cast and cure two sets of two standard cylinder (6x12 in) specimens or three 4x8 in specimens for each composite sample.

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6. Compressive-Strength Tests: ASTM C 39; test specimens as required by structural drawings general notes requirements.

    a. A compressive-strength test shall be the average compressive strength from a set of two 6x12 in (or three 4x8 in) specimens obtained from same composite sample and tested at age indicated.

7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
9. Test results shall be reported in writing to Architect, structural engineer, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for specified age of test.
10. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

11. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect / structural engineer. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 within 48 hours of finishing.

3.18 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

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SECTION 03 35 46

CONCRETE TOPICAL TREATMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Topical treatments for concrete.

B. Principal Products:
1. Densifier, sealer, and dust-proofing concrete treatment products.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate application of floor sealers with concrete curing processes and installation of floor-mounted items.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data.

B. Shop Drawings: Floor plan showing locations receiving sealers.

1.4 QUALITY ASSURANCE

A. Field Samples: Apply floor sealer, 10 by 10 feet, minimum size. Demonstrate appearance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store concrete sealer in manufacturer's original unopened containers.
2. Protect from freezing.

PART 2 PRODUCTS

2.1 CONCRETE FLOOR SEALER

A. Concrete Sealer: Clear, penetrating, VOC compliant, waterborne siliconate compound designed to densify and seal concrete surfaces.
   1. Manufacturers and Products:
      a. Euclid Chemical Company Ultrasil LI+ as basis of design.
      b. Curecrete Chemical Company.
      c. H&C.
      d. LATICRETE.
      e. Or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Uncured Application:
   1. Verify final troweling is complete.
   2. Verify concrete is set sufficiently so application of concrete sealer will not mar concrete surface.

B. Cured Application:
   1. Verify floor surfaces are free of substances that may impair concrete sealer penetration.

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3.2 PREPARATION

A. Remove membrane forming curing compounds and other surface contaminates capable of impairing concrete sealer penetration into concrete.

B. Broom clean floor surface to remove loose dust and dirt.

C. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.

3.3 UNCURED CONCRETE APPLICATION

A. Apply concrete sealer immediately after final troweling.

B. Keep floor surface wet with concrete sealer for 20 minutes, minimum.

C. Broom concrete sealer to prevent puddling; achieve uniform coverage on floor surface.

D. Remove excess liquid material and residue from floor surface.

E. Saw Cut Floor Joints: Treat joints after cutting.
   1. Remove cement dust from joints and floor surface.
   2. Flood joints with concrete sealer.

3. When curing is complete, clean joints and seal per Section 07 92 00.

F. Complete second application of concrete sealer before Substantial Completion.

3.4 CURED CONCRETE APPLICATION

A. Apply concrete sealer.

B. Keep floor surface wet with concrete sealer for 20 minutes, minimum.

C. Broom concrete sealer to prevent puddling; achieve uniform coverage on floor surface.

D. Scrub concrete sealer into concrete surface with mechanical scrubbers.

E. Remove excess liquid material and residue from floor surface.

F. Rinse floor.

3.5 PROTECTION

A. Prohibit traffic on floor finish for eight hours minimum after installation.

END OF SECTION

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SECTION 03 54 00

CAST UNDERLAYMENT

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Cast underlayment for patching and leveling of concrete floor slabs.

B. Principal Products:
1. Portland cement underlayment.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with demolition and requirements of Finish Flooring.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Submit physical characteristics and product limitations.

B. Shop Drawings:
1. Plans showing underlayment locations and average depths.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates:
1. Manufacturer Certificate: Certify underlayment and floor covering systems are compatible.

B. Test and Evaluation Reports: Manufacturer test results showing:
1. Acoustic performance.
2. Fire performance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store products indoors, protected from elements, in manufacturer unopened packaging.

1.6 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
   2. Temperature: 50 degrees F, minimum; 80 degrees, maximum.

PART 2 PRODUCTS

2.1 PORTLAND CEMENT UNDERLAYMENT

A. Self-leveling Portland Cement Based Underlayment:
   1. Manufacturers and Products:
      a. ARDEX K 13.
      b. Custom Building Products LevelQuick.
      c. MAPEI PlaniLevel 560.
      d. Koster SL Premium.
      e. Maxxon Corporation Level-Right LDF.
      f. USG Corporation Levelrock 4500 Series.
   2. 28 Day Compressive Strength: ASTM C109/C109M, 4,500 psi, minimum.
   3. Components:
      a. Binding Agents: Portland, hydraulic or blended cement, ASTM C150 or ASTM C219.
      b. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch, or coarse sand.
      c. Water: Potable.
      d. Reinforcement: Manufacturer recommended type.
   4. Primer: Manufacturer recommended type.
   5. Sealant: Manufacturer recommended type.

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2.2 PERFORMANCE

A. Fire Resistance: ASTM E119.
   1. Follow tested assembly requirements.

2.3 MIXES

A. Mix cementitious materials with water.
   1. Mix in aggregate for installations over maximum allowed neat mix depth.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify substrate surfaces are clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate.

3.2 PREPARATION

A. Surface Preparation:
   1. Fill cracks with sealant or cementitious material.
   2. Seal joints and edges to prevent underlayment leaking to floors below.

3.3 APPLICATION

A. Prime substrates.

B. Apply underlayment. Produce a uniform, smooth, level surface; align with adjacent floor.

C. Cure underlayment.

3.4 PROTECTION

A. Protection: Protect underlayment until covered with finished flooring.

END OF SECTION

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SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Unit masonry.

B. Principal Products:
1. Brick.
2. Mortar and grout.
3. Flashing.
4. Veneer ties.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with weather barriers.

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B. Preinstallation Meeting:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Submittals - General: Follow TMS 602.

B. Product Data.
1. Initial selection color samples.

C. Shop Drawings.
1. Masonry Units: Shapes, sizes, profiles, and coursing.
2. Reinforcing Steel: ACI 315R, show placement of bars in masonry.

D. Samples:
1. Brick: Three individual brick illustrating variations in matching existing veneer brick.
2. Mortar color.
3. Accessories: flashing and control joints.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates: Data substantiating compliance with requirements for the following:
1. Brick: Size tolerance and Efflorescence.
2. Mortar: Mix designs for compressive strength.

B. Qualification Statements: Manufacturer.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Flashing Installers: Workers who have completed International Masonry Institute flashing upgrade course.
2. Grout and Reinforcing Installers: Workers who have completed International Masonry Institute grouting and reinforced masonry upgrade course.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Masonry Units: Store elevated above grade, protected from precipitation and stormwater runoff. Do not use wet units.
2. Mortar and Grout: Store elevated above grade, protected from moisture. Do not use materials that have become damp.

1.7 FIELD CONDITIONS

A. Cold Weather: TMS 602.
1. Do not use frozen or frost damaged materials.

B. Hot Weather: TMS 602.

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PART 2 PRODUCTS

2.1 BRICK

A. General: New brick shall match existing veneer brick, Use new brick at locations where existing veneer is affected by the Work, or where new brick is required to be added to existing.

B. Solid Face Brick: ASTM C216.
1. Match existing brick.
2. Grade: MW.
3. Type: FBX.
4. Brick Size: Match existing.
5. Special Shapes: Exposed surfaces matching facesMatch existing.
6. Color: Match existing.

2.2 MORTAR AND GROUT

A. Portland Cement: ASTM C150, Type I.
1. Color: As required to match existing veneer mortar.

B. Hydrated Lime: ASTM C207, Type S.

C. Packaged Mortar Mix: Factory blend of portland cement and hydrated lime.

D. Mortar Aggregate: ASTM C144.

E. Colored Mortar: Contractor option, provide mortar pigments, portland cement, and aggregates to create specified color or packaged colored mortar blend.
   1. Mortar Pigments: ASTM C979, products formulated for masonry mortar.
      a. Manufacturers and Products:
         1) Davis Colors True Tone Mortar Colors.
         2) Euclid Chemical Color-Crete.
         3) Lanxess Corp Bayferrox Iron Oxide Pigments.
         4) Solomon Colors SGS Mortar Colors.
   2. Colored Mortar Blend: Packaged pre-colored blend of portland cement and hydrated lime with blended aggregate.
      a. Manufacturers and Products:
         1) Amerimix AMX 405C.
         2) Glen-Gery Color Mortar Blend.
         3) Spec Mix Colored Mortar.
         4) WORKRITE Colored Portland Cement & Lime.
   3. Color: Match existing.

F. Water: Potable, free of substances that cause discoloration or adversely affect mortar setting or strength.

G. Mortar Mixes:
   1. Mortar: Portland cement-lime mortar, ASTM C270, Property Specification.
   2. Mortar Compressive Strength:
      a. Structural Masonry: Mortar type required to provide masonry compressive strength shown on Drawings.
      b. Reinforced Masonry: Type S.
      c. Non-Load-Bearing Walls: Type N.
   3. Admixtures: Containing no calcium chloride.

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2.3 STEEL MATERIALS

A. Steel Wire: ASTM A1064, hot-dip galvanized per ASTM A153.

B. Steel Sheet: ASTM A1008, Commercial Steel, hot-dip galvanized per ASTM A153.

C. Steel Plates, Shapes, and Bars: ASTM A36, hot-dip galvanized per ASTM A153.

D. Steel Anchors: ASTM B633 Class Fe/Zn 5 minimum, zinc-plated steel.

E. Stainless Steel Wire: ASTM A580, Type 304.

F. Stainless Steel Sheet: ASTM A666, Type 304.

G. Stainless Steel Anchors: ASTM F593 and ASTM F594, Alloy Group 1.

2.4 VENEER ANCHORS

A. Veneer Anchors - General: Resist tension and compression forces perpendicular to wall plane.
   1. Performance: Withstand 100-lbf tension and compression loads without deforming.
   2. Veneer Tie Size: Extend to outer half of veneer, over 5/8 inch from outside face.
   3. Seismic Support: Continuous steel wires clipped to each veneer tie.
      a. Clip: Reinforcing manufacturer standard product.

B. Wood Studs and Sheathing Attachment: One of the following types.
   1. Horizontal Plate Anchors: Horizontally oriented L shaped plate and wire tie, stainless steel, for screw attachment.
      a. Manufacturers and Products:
         1) 3GEN Masonry Products H-13-H.
         2) Heckmann Building Products Parts 213 and 282.
         3) Hohmann & Barnard HB-213.
         4) Wire-Bond RJ-711.
   2. Vertical Plate Anchors: Vertically oriented L shaped plates and trapezoidal wire ties, stainless steel, for screw attachment.
      a. Manufacturers and Products:
         1) 3GEN Masonry Products H-13-V.
         2) Hohmann & Barnard BL 407.
         3) PROSOCO Veneer-Tie.
         4) Wire-Bond 2407.
      b. Insulation Washers: Anchor manufacturer plastic wedge shaped insulation anchors.
         1) Hohmann & Barnard Blok-Lok Wedge-Lok.
   3. Horizontal Pronged Plate Anchors: L-shaped anchors and wire ties, stainless steel, for screw attachment. Prongs penetrate sheathing and rest against studs.
      a. Manufacturers and Products:
         1) Hohmann & Barnard HB-200-X.
         2) Wire-Bond HCL-711.

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2.5 SHEET METAL FLASHING

A. Stainless Steel Flashing:
   1. Stainless Steel Sheet: ASTM A240, Type 304, 0.016 inch thick.
   2. Solder: ASTM B32, Grade Sn60, flashing manufacturer recommended type.

B. Flashing Fabrication: Cut and form flashing as follows:
   1. End Dams: Extend flashing 6 inches minimum beyond lintels and turn edges up 2 inches minimum.
   2. Drip Edges: Extend flashing through veneer, turn down 45 degrees and hem edges.

2.6 FLEXIBLE FLASHING

A. Flexible Sheet Membrane Flashing: Self-adhering, composite polyethylene membrane laminated to butyl or proprietary adhesive sheet and abrasion-resistant coating.
   1. Manufacturers and Products:
      a. 3GEN Masonry Products Genflash.
      b. Carlisle CCW BRT-801.
      c. GCP Applied Technologies Grace Ultra.
      d. Protecto Wrap Company Protecto Seal 45 Butyl.

e. York Wicked Good Flashing.

B. Flashing Accessories: Flashing manufacturer products required for complete installation:
1. Termination Bars: Aluminum.
2. Preformed corners, end dams, special shapes, and seaming materials.
3. Adhesives and primers.

2.7 PERFORMANCE

A. Fire Resistance:
1. Fire-Rated Assemblies: ASTM E119.

2.8 ACCESSORIES

A. Control Joint Gaskets: Rubber and Neoprene material. Furnish with corner and tee accessories, heat or cement fused joints.

B. Compressible Filler: Closed cell polyethylene and rubber; oversized 50 percent to joint width; self expanding.

C. Non-Acid Masonry Cleaners: Masonry unit manufacturer recommended product; not harmful to masonry or adjacent materials.

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PART 3 EXECUTION

3.1 EXAMINATION

A. Verify field conditions are acceptable and are ready to receive Work.
1. Verify foundations are within specified tolerances.
2. Verify reinforcing is properly placed.
3. Verify rough-in for piping and electrical systems are properly placed.

3.2 PREPARATION

A. Coordinate placement of anchors provided under other Sections.

3.3 INSTALLATION - GENERAL

A. Matching: Match existing masonry as closely as possible in every aspect.

B. Maintain masonry courses to uniform dimensions. Form uniform thickness vertical and horizontal joints.

C. Use full size units unless cutting is unavoidable. Cut units to provide clean, sharp, unchipped edges. Conceal cut edges wherever possible.

D. Blending Exposed Masonry: Mix units to produce uniform blend of colors and textures.

E. Protection During Installation: Cover open masonry walls, projections, and sills when work is not in progress; utilize waterproof membrane.
   1. Extend protection 24 inches, minimum, on both sides of wall.

F. Stain Prevention: Immediately remove mortar and soil.
   1. Protect in place construction from mortar droppings.
   2. Protect walls from rain water splashing up from ground or scaffold.

3.4 INSTALLATION OF MASONRY VENEER

A. Facing Units:
   1. Bond: Lay exposed units in bond matching existing.
   2. Mortar Joints: Tool to profile matching existing.

B. Anchoring: Anchor masonry veneers to backup construction.
   1. Anchor Spacing:
      a. One anchor for each 1.77 sq ft of wall.
      b. Space anchors 16 inches horizontally and 16 inches vertically.
   2. Seismic Reinforcement: Continuous horizontal wire attached to ties, installed in facing wythe.

3.5 INSTALLATION OF CONTROL AND EXPANSION JOINTS

A. Expansion Joints in Brick: One of the following methods.
   1. Preformed factory fabricated fillers built into masonry.
   2. Compressible joint fillers built into masonry.
      a. Apply sealant to open joints.

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3.6 INSTALLATION OF FLASHING, WEEPS, AND DRAINAGE

A. Install flashing in the following locations to effectively drain water from wall cavities.
   1. Where shown on Drawings.
   2. At obstructions to downward flow of water in wall.

B. Rigid Sheet Metal Flashing:
   1. Extend flashing horizontally through outer wythe, extend out beyond face and turn down and hem to form continuous drip edge.
   2. Turn flashing up backup construction, 8 inches minimum and secure in termination bar.

C. Flexible Flashing:
   1. Install metal drip edges at exterior face of wall.
   2. Install flexible flashing 1/2 inch back from outside face of exterior wall.
   3. Turn flashing up backup construction, 8 inches minimum and fully adhere to substrate or secure in termination bar.

3.7 REPAIRING AND POINTING

A. Repairing and Replacing:
   1. Remove and replace chipped, broken, or stained units.
   2. Remove and replace units that do not match adjacent units.

3. Set replacement units in fresh mortar; point to eliminate evidence of replacement.

B. Pointing: Enlarge voids and holes and fill with mortar. Point joints to provide neat, uniform appearance.

3.8 CLEANING

A. In Progress Cleaning: Dry brush to remove excess mortar before tooling joints.

B. Final Cleaning: Clean exposed masonry as follows:
1. Allow mortar to set and cure.
2. Scrape to remove excess mortar.
3. Clean brick by bucket-and-brush hand-cleaning method per BIA Technical Note 20.
4. Clean brick by pressurized water cleaning method per BIA Technical Note 20.

C. Final Cleaning: Clean exposed masonry as follows:
1. Allow mortar to set and cure.
2. Scrape to remove excess mortar.
3. Wet wall before applying cleaners.
4. Clean masonry.
5. Rinse cleaner from brick thoroughly.

END OF SECTION

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DIVISION - STRUCTURAL STEEL FRAMING

SECTION 05 12 00

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural steel.
2. Grout.

B. Related Sections:

1. Section 014000 "Quality Requirements" for independent testing agency procedures and administrative requirements.
2. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
3. Section 053100 "Steel Decking" for field installation of shear connectors through deck.
4. Section 055000 "Metal Fabrications" for steel lintels and shelf angles not attached to structural-steel frame, miscellaneous steel fabrications, and other metal items not defined as structural steel.
5. Section 055100 "Metal Stairs."
6. Section 099113 "Exterior Painting" and Section 099123 "Interior Painting", and Section 099600 "High-Performance Coatings" for surface-preparation and priming requirements.

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1.2 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC 303, "Code of Standard Practice for Steel Buildings and Bridges."

1.3 PERFORMANCE REQUIREMENTS

A. Connections: Provide complete connections using details and beam reactions, if applicable, as indicated in the Structural Drawings.

B. Moment Connections: Provide complete connections using details indicated in the Structural Drawings.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
2. Laboratory Test Reports for Credit IEQ 4: For primers, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Drawings: Show fabrication of structural-steel components.

1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.

D. Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide according to AWS D1.1, "Structural Welding Code - Steel," for each welded joint whether prequalified or qualified by testing, including the following:

1. Power source (constant current or constant voltage).
2. Electrode manufacturer and trade name, for demand critical welds.

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1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and fabricator.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.

D. Mill test reports for structural steel, including chemical and physical properties.

E. Product Test Reports: For the following:

1. Bolts, nuts, and washers including mechanical properties and chemical analysis.
2. Direct-tension indicators.
3. Tension-control, high-strength bolt-nut-washer assemblies.
4. Shear stud connectors.
5. Shop primers.
6. Nonshrink grout.

F. Source quality-control reports.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category STD.

B. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category **ASCE**.

C. Shop-Painting Applicators: Qualified according to AISC's Sophisticated Paint Endorsement [**P1**] [**P2**] [**P3**] or SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1. Welders and welding operators performing work on bottom-flange, demand-critical welds shall pass the supplemental welder qualification testing, as required by AWS D1.8. FCAW-S and FCAW-G shall be considered separate processes for welding personnel qualification.

E. Comply with applicable provisions of the following specifications and documents:

1. AISC 303.
2. AISC 341 and AISC 341s1.
3. AISC 360.
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

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1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.

1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.

1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
2. Clean and relubricate bolts and nuts that become dry or rusty before use.
3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F 1852 fasteners and for retesting fasteners after lubrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than the following:

1. W-Shapes: 60 percent.
2. Channels, Angles, M , S-Shapes: 60 percent.
3. Plate and Bar: 25 percent.
4. Cold-Formed Hollow Structural Sections: 25 percent.
5. Steel Pipe: 25 percent.
6. All Other Steel Materials: 25 percent.

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C. Structural Steel Shapes, Sections, and Plates: Per the Structural Drawings General Notes.

D. Steel Castings: ASTM A 216, Grade WCB with supplementary requirement S11.

E. Steel Forgings: ASTM A 668.

F. Welding Electrodes: Per the Structural Drawings General Notes.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. Bolt, Connectors, and Anchors: Per the Structural Drawings General Notes.

B. Clevises and Turnbuckles: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1035.

C. Eye Bolts and Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1030.

D. Sleeve Nuts: Made from cold-finished carbon steel bars, ASTM A 108, Grade 1018.

2.3 PRIMER

A. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Primer: Comply with [**Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."**] [**Section 099600 "High-Performance Coatings."**] [**Section 099113 "Exterior Painting," Section 099123 "Interior Painting," and Section 099600 "High-Performance Coatings."**]

C. Primer: SSPC-Paint 25, [**Type I**] [**Type II**], zinc oxide, alkyd, linseed oil primer.

D. Primer: SSPC-Paint 25 BCS, [**Type I**] [**Type II**], zinc oxide, alkyd, linseed oil primer.

E. Primer: SSPC-Paint 23, latex primer.

F. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.

G. Galvanizing Repair Paint: [**MPI#18, MPI#19, or SSPC-Paint 20**] [**ASTM A 780**].

2.4 GROUT

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A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC 360.

1. Camber structural-steel members where indicated.
2. Fabricate beams with rolling camber up.
3. Identify high-strength structural steel according to ASTM A 6 and maintain markings until structural steel has been erected.
4. Mark and match-mark materials for field assembly.
5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.

1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

C. Bolt Holes: Cut, drill, **mechanically thermal cut,** or punch standard, short slotted, or long-slotted bolt holes per the Structural Drawing requirements perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 2, "Hand Tool Cleaning."

F. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1/D1.1M and manufacturer's written instructions.

G. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces.
2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Per Structural Drawings General Notes.

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B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC 303 for mill material.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:

1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
2. Surfaces to be field welded.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."
3. SSPC-SP 7/NACE No. 4, "Brush-Off Blast Cleaning."

4. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."
5. SSPC-SP 14/NACE No. 8, "Industrial Blast Cleaning."
6. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
7. SSPC-SP 10/NACE No. 2, "Near-White Blast Cleaning."
8. SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning."
9. SSPC-SP 8, "Pickling."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123.

1. Fill vent and drain holes that will be exposed in the finished Work unless they will function as weep holes, by plugging with zinc solder and filing off smooth.
2. Galvanize items per the Contract Drawings.

2.9 SOURCE QUALITY CONTROL

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A. Testing Agency: Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.

1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:

1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1/D1.1M for stud welding and as follows:

1. Bend tests will be performed if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with steel Erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

1. Prepare a certified survey of bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated.

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3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC 303 and AISC 360.

B. Base Bearing and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.

1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of baseplate.
3. Snug-tighten or Pretension anchor rods as required per the Structural Drawings after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be

in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.
2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Per the Structural Drawings.

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B. Weld Connections: Comply with AWS D1.1 and AWS D1.8 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

1. Comply with AISC 303 and AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances in AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.

1. In addition to visual inspection, field welds will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:

a. Liquid Penetrant Inspection: ASTM E 165.
b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:

1. Perform bend tests if visual inspections reveal either a less-than-continuous 360-degree flash or welding repairs to any shear connector.
2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

3.6 REPAIRS AND PROTECTION

A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing and repair galvanizing to comply with ASTM A 780.

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B. Touchup Painting: Immediately after erection, clean exposed areas where primer is damaged or missing and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

C. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting"Section 099123 "Interior Painting."

END OF SECTION

SECTION 05 50 00

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Miscellaneous metal fabrications.

B. Principal Products:
1. Steel lintels.
2. Ledge angles.
3. Bollards.
4. Steel plate shelf.
5. Miscellaneous steel supports and framing.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this section with requirements of Work to recieve metal fabrications.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Manufactured bollards.

B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
1. Overhead door supports.
2. Miscellaneous steel supports and framing.
3. Bollards.
4. Steel lintels.
5. Steel ledge angles.

1.4 INFORMATIONAL SUBMITTALS

A. Research Evaluation Reports: Post-installed anchor ICC-ES reports.

B. Qualification Statements:
1. Delegated Design Engineer qualifications.
2. Welders.

C. Mill Certificates: Signed by stainless steel manufacturers, certifying that products furnished comply with requirements.

1.5 QUALITY ASSURANCE

A. Welding Qualifications:
   1. Steel Fabrications: AWS D1.1.
   2. Aluminum Fabrications: AWS D1.2.

1.6 FIELD CONDITIONS

A. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 PERFORMANCE

A. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

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2.2 MATERIALS - STEEL

A. Steel Structural Wide Flange Shapes: ASTM A992.

B. Steel Hollow Structural Sections: ASTM A500, Grade B.

C. Other Steel Structural Shapes: ASTM A36.

D. Steel Plates: ASTM A36.

E. Steel Pipe: ASTM A53, Grade B.

F. Steel Sheet: ASTM A653, Grade 33 Structural Quality, G60 galvanizing.

G. Steel Bolts: ASTM A307, Grade A or B, heavy hex style.
   1. Finish: Hot-dip galvanized.

H. Steel Nuts: ASTM A563, types appropriate for bolts.
   1. Finish: Hot-dip galvanized.

I. Welding Materials: AWS D1.1, types as required for materials being welded.

2.3 MATERIALS - STAINLESS STEEL

A. Stainless Steel Bars and Shapes: ASTM A276, Type 304.

B. Stainless Steel Tubing: ASTM A269, Type 304.

C. Stainless Steel Plate, Sheet, and Strip: ASTM A240, Type 304.

D. Stainless Steel Bolts, Nuts, and Washers: ASTM A354.

E. Welding Materials: ASW D1.6, types as required for materials being welded.

2.4 MATERIALS - ALUMINUM

A. Extruded Aluminum: ASTM B221, Alloy 6063, Temper T5 or T6.

B. Aluminum Sheet: ASTM B209, Alloy 6063, Temper T6.

C. Aluminum Drawn Seamless Tubes: ASTM B210, Alloy 6063, Temper T6.

D. Aluminum Bars: ASTM B211, Alloy 6063, Temper T6.

E. Bolts, Nuts, and Washers for Aluminum Components: Stainless steel, Type 304.

F. Welding Materials: AWS D1.2, types as required for materials being welded.

2.5 MISCELLANEOUS MATERIALS

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A. Post-Installed Anchors: Torque-controlled expansion anchors.
   1. Material: Steel.

B. Concrete Embedment Anchors: Wedge type for adjustable bolt location; malleable iron or cast steel. Supply bolts, washers, and shims with ASTM F2329 hot-dip galvanized finish.

C. Shop Primer: primer specified in Section 099000.

D. Zinc Rich Primer: SSPC Paint 20, Type II Organic.

E. Separation Coating: Bituminous paint; SSPC-Paint 12.

2.6 FABRICATION - GENERAL

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to uniform small radius.

E. Exposed Welded Joints: NOMMA Guideline 1 Joint Finish 2.

F. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

G. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

H. Tolerances:
1. Squareness: 1/8 inch maximum difference in diagonal measurements.
2. Face Offset: 1/16 inch, maximum.
3. Misalignment of Adjacent Members: 1/16 inch, maximum.
4. Bow: 1/8 inch in 48 inches, maximum.
5. Plane: 1/8 inch deviation in 48 inches, maximum.

2.7 FABRICATION - LINTELS AND LEDGE ANGLES

A. Loose Steel Lintels: Steel sections, size and configuration shown on Drawings, length for minimum 8 inch bearing both sides of opening.

B. Ledge Angles: Steel sections, size and configuration shown on Drawings; shop-drilled fastener holes. Fabricate for 1/4 inch gap between units.

C. Built-Up Lintel Assemblies: Steel structural sections and plate shown on Drawings.

D. Finishes:
1. Exterior Walls: Shop primer.
2. Interior Walls: Shop primer.

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2.8 FABRICATION - STEEL PLATE SHELF

A. Provide fabricated steel plate shelf as shown on Drawings.

B. Provide support brackets, ledgers, and fittings as shown on Drawings.

C. Finish: Field painted finish, see Finish Schedule.

2.9 FABRICATION - BOLLARDS

A. Manufactured Decorative Bollards: Provide bollards prepared for lighting, entry actuation, or other functions as shown on Drawings.
1. Manufacturers and Products: Provide HE-Williams OSC10R-HG-DT bollard as basis of design or approved equal product.
2. Material: Prestressed, reinforced, cast hollow core concrete. with a light sand blasted finish.
a. Bollard Cap: Same material and finish as bollard.
b. Finish: Light sand blasted finish.
3. Lighting Shield: Cast aluminum, 0.188 inch thickness.
a. Light Diffuser: UV stabilized acrylic.
b. Finish: manufacturer standard polyester finish.
1) Color: Architect selected.
c. Lighting: Manufacturer standard LED package.

4. Mounting: Manufacturer standard galvanized steel baseplate.

2.10 FABRICATION - MISCELLANEOUS STRUCTURAL SUPPORTS

A. Delegated Design: Supports fabricated from structural steel shapes coordinated with supported item manufacturer anchorage requirements and building structure.

B. Other Supports: Structural steel sections to support applied loads; shop primer finish.

2.11 STEEL FINISHES

A. Prepare surfaces to be primed per SSPC SP 2.

B. Clean surfaces of rust, scale, grease, and foreign matter before finishing.

C. Do not prime surfaces in direct contact with concrete or where field welding is required.

D. Prime paint items in fabrication shop with two coats except where galvanizing is specified.

E. Galvanizing: ASTM A123; hot-dip galvanize after fabrication.

F. Galvanizing for Fasteners, Connectors, and Anchors:
1. Hot-Dip Galvanizing: ASTM A153.
2. Mechanical Galvanizing: ASTM B695; Class 50 minimum.

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PART 3 EXECUTION

3.1 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates for items required to be cast into concrete.

C. Apply separation coating to aluminum surfaces contacting dissimilar metals, concrete, and masonry.

3.2 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Separate dissimilar exterior metals with non-absorptive gaskets.

C. Make provisions for erection stresses. Install temporary bracing to maintain alignment, until permanent bracing and attachments are installed.

D. Fasten Work rigidly and securely to supports.

E. Field weld components shown on Shop Drawings per AWS D1.1.

F. Obtain Architect approval before site cutting or making unanticipated adjustments.

G. After erection, touch up welds, abrasions, and damaged finishes with prime paint or zinc-rich paint to match shop finishes.

H. Miscellaneous Framing and Supports:
   1. Attach supports rigidly and securely to building structural elements.
   2. Brace overhead support framing to prevent movement of supported items.

I. Bollards:
   1. Install decorative bollards per manufacturer instructions.

3.3 INSTALLATION TOLERANCES

A. Plumb: 1/4 inch deviation maximum, either per story or every 12 ft in height, whichever is greater; non-cumulative.

B. Alignment: 1/8 inch offset deviation, maximum.

C. Position: 1/4 inch deviation, maximum.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.

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B. Field Weld Inspection: AWS D1.1.

C. Non-Conforming Work: Make corrections or replace, and retest.

3.5 ADJUSTING

A. Clean and touch up damaged primer paint with same product applied in shop.

END OF SECTION

DIVISION 6 - ROUGH CARPENTRY

SECTION 06 10 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Framing with dimension lumber.
2. Framing with timber.
3. Framing with engineered wood products.
4. Shear wall panels.
5. Rooftop equipment bases and support curbs.
6. Wood blocking[**, cants,**] and nailers.
7. Wood furring[**and grounds**].
8. Wood sleepers.
9. Utility shelving.
10. Plywood backing panels.

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B. Related Requirements:

1. Section 061063 "Exterior Rough Carpentry."
2. Section 061300 "Heavy Timber Construction."
3. Section 061533 "Wood Patio Decking" for elevated decks, including support framing.
4. Section 061600 "Sheathing" for sheathing, subflooring, and underlayment.
5. Section 061753 "Shop-Fabricated Wood Trusses" for wood trusses made from dimension lumber.
6. Section 313116 "Termite Control" for site application of borate treatment to wood framing.

1.3 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) size or greater but less than 5 inches nominal (114 mm actual) size in least dimension.

C. Exposed Framing: Framing not concealed by other construction.

D. OSB: Oriented strand board.

E. Timber: Lumber of 5 inches nominal (114 mm actual) size or greater in least dimension.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.

B. Fastener Patterns: Full-size templates for fasteners in exposed framing.

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1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.

B. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated wood.
2. Fire-retardant-treated wood.
3. Engineered wood products.
4. Shear panels.
5. Power-driven fasteners.
6. Post-installed anchors.
7. Metal framing anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, **mark grade stamp on end or back of each piece**.
3. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: **19 percent** unless otherwise indicated.

C. Engineered Wood Products: Acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.

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1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 **for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground**.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. **Do not use inorganic boron (SBX) for sill plates.**
2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

1. For exposed lumber indicated to receive a stained or natural finish, **mark end or back of each piece**.

D. Application: Treat **items indicated on Drawings, and the following:**

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, **furring, stripping,** and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

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1. Treatment shall not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.

C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

1. For exposed lumber indicated to receive a stained or natural finish, **mark end or back of each piece**.

E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat **items indicated on Drawings, and the following:**

1. Framing for raised platforms.
2. Framing for stages.
3. Concealed blocking.
4. Framing for non-load-bearing partitions.
5. Framing for non-load-bearing exterior walls.
6. Roof construction.
7. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

A. Non-Load-Bearing Interior Partitions: **No. 2** grade.

1. Application: **Interior partitions not indicated as load bearing**.
2. Species:
   a. Douglas fir-larch; WCLIB or WWPA.

B. Load-Bearing Partitions: **No. 2** grade.

1. Application: **Exterior walls and interior load-bearing partitions**.
2. Species:
   a. Douglas fir-larch; WCLIB or WWPA.

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C. Ceiling Joists: **No. 2** grade.

1. Species:
   a. Douglas fir-larch; WCLIB or WWPA.

D. Joists, Rafters, and Other Framing Not Listed Above: **No. 2** grade.

1. Species:
   a. Douglas fir-larch; WCLIB or WWPA.

2.5 TIMBER FRAMING

A. Comply with the following requirements, according to grading rules of grading agency indicated:

1. Species and Grade: Douglas fir-larch, **No. 1** grade; NLGA, WCLIB, or WWPA.
2. Maximum Moisture Content: 19 percent.
3. Additional Restriction: Free of heart centers.

2.6 ENGINEERED WOOD PRODUCTS

A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.

B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
1. Extreme Fiber Stress in Bending, Edgewise: **2600 psi (17.9 MPa)** for 12-inch nominal- (286-mm actual-) depth members.
2. Modulus of Elasticity, Edgewise: **2,000,000 psi (13 700 MPa)**.

C. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
1. Extreme Fiber Stress in Bending, Edgewise: 2900 psi (20 MPa) for 12-inch nominal- (286-mm actual-) depth members.
2. Modulus of Elasticity, Edgewise: 2,200,000 psi (15 100 MPa).

D. Wood I-Joists: Prefabricated units, I-shaped in cross section, made with solid or structural composite lumber flanges and wood-based structural panel webs, let into and bonded to flanges. Comply with material requirements of and with structural capacities established and monitored according to ASTM D5055.
1. Web Material: **Either OSB or plywood, complying with DOC PS 1 or DOC PS 2, Exposure 1**.
2. Structural Properties: Depths and design values not less than those indicated.
3. Comply with APA PRI-400. Factory mark I-joists with APA-EWS trademark indicating nominal joist depth, joist class, span ratings, mill identification, and compliance with APA-EWS standard.

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E. Rim Boards: Product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research or evaluation report for I-joists.

1. Manufacturer: Provide products by same manufacturer as I-joists.
2. Material: **product made from any combination solid lumber, wood strands, and veneers**].
3. Thickness: Per structural drawings **1-1/2 inches (38 mm) minimum**.
4. Comply with APA PRR-401, [**rim board**] [**rim board plus**] grade. Factory mark rim boards with APA-EWS trademark indicating thickness, grade, and compliance with APA-EWS standard.

F. Insulated Rim Boards: Insulated product designed to be used as a load-bearing member and to brace wood I-joists at bearing ends, complying with research/evaluation report for I-joists.

1. Manufacturer: Provide products by same manufacturer as I-joists.
2. Rim Board Material: **product made from any combination solid lumber, wood strands, and veneers**.
3. Rim Board Thickness: Per structural drawings **1-1/2 inches (38 mm) minimum**.
4. Insulation: 1-1/2-inch- (38-mm-) thick polyisocyanurate foam complying with ASTM C1289.
5. Inside Facing: 7/16-inch- (11-mm-) thick OSB.

6. Comply with APA PRR-401, **rim board** grade. Factory mark rim boards with APA-EWS trademark indicating thickness, grade, and compliance with APA-EWS standard.

2.7 SHEAR WALL PANELS

A. Wood-Framed Shear Wall Panels: Prefabricated assembly consisting of wood perimeter framing, tie downs, and Exposure I, Structural I plywood or OSB sheathing.

B. Steel-Framed Shear Wall Panels: Prefabricated assembly consisting of cold-formed galvanized-steel panel, steel top and bottom plates, and wood studs.

C. Allowable design loads, as published by manufacturer, shall meet or exceed those **indicated**. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.8 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.
5. Furring.

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B. Dimension Lumber Items: **No. 2** grade and **the following species:**

1. Douglas Fir-Larch; WCLIB or WWPA

C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

E. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.9 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners **with hot-dip zinc coating complying with ASTM A153/A153M**.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on **ICC-ES** as appropriate for the substrate.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2 (ASTM F738M and ASTM F836M, Grade A1 or A4).

2.10 METAL FRAMING ANCHORS

A. Allowable design loads, as published by manufacturer, shall meet or exceed those **indicated**. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

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B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A653/A653M, G60 (Z180) coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, **Type 304**.

1. Use for exterior locations and where indicated.

E. Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges at least 85 percent of joist depth.

1. Thickness: As Indicated.

F. I-Joist Hangers: U-shaped joist hangers with 2-inch- (50-mm-) long seat and 1-1/4-inch- (32-mm-) wide nailing flanges full depth of joist. Nailing flanges provide lateral support at joist top chord.

1. Thickness: As Indicated.

G. Top Flange Hangers: U-shaped joist hangers, full depth of joist, formed from metal strap with tabs bent to extend over and be fastened to supporting member.

1. Strap Width: As Indicated.
2. Thickness: As Indicated.

H. Bridging: Rigid, V-section, nailless type, 0.050 inch (1.3 mm) thick, length to suit joist size and spacing.

I. Post Bases: Adjustable-socket type for bolting in place with standoff plate to raise post 1 inch (25 mm) above base and with 2-inch- (50-mm-) minimum side cover, socket 0.062 inch (1.6 mm) thick, and standoff and adjustment plates 0.108 inch (2.8 mm) thick.

J. Joist Ties: Flat straps, with holes for fasteners, for tying joists together over supports.

1. Width: As Indicated.
2. Thickness: As Indicated.
3. Length: As Indicated.

K. Roof Truss and Roof Joist Tie-Downs (Hurricane or Seismic Ties): Bent strap tie for fastening rafters or roof trusses to wall studs below, 2-1/4 inches (57 mm) wide by 0.062 inch (1.6 mm) thick. Tie fits over top of rafter or truss and fastens to both sides of rafter or truss, face of top plates, and side of stud below.

L. Floor-to-Floor Ties: Flat straps, with holes for fasteners, for tying upper floor wall studs to band joists and lower floor studs, 1-1/4 inches (32 mm) wide by 0.050 inch (1.3 mm) thick by 36 inches (914 mm) long.

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M. Tie-Downs: ATS system by Tie-Down Manufacturer.

N. Wall Bracing: T-shaped bracing made for letting into studs in saw kerf, 1-1/8 inches (29 mm) wide by 9/16 inch (14 mm) deep by 0.034 inch (0.85 mm) thick with hemmed edges.

O. Wall Bracing: Angle bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch (24 by 24 by 1 mm) thick with hemmed edges.

2.11 MISCELLANEOUS MATERIALS

A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; 1-inch (25-mm) nominal thickness, compressible to 1/32 inch (0.8 mm); selected from manufacturer's standard widths to suit width of sill members indicated.

B. Sill-Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to suit width of sill members indicated.

C. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, **butyl rubber** compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

D. Adhesives for Gluing **Furring and Sleepers** to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.

E. Water-Repellent Preservative: NWWDA-tested and -accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.

B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.

C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate **furring,** nailers, blocking, and similar supports to comply with requirements for attaching other construction.

D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. **Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.**

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E. Install shear wall panels to comply with manufacturer's written instructions.

F. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

G. Install sill sealer gasket to form continuous seal between sill plates and foundation walls.

H. Do not splice structural members between supports unless otherwise indicated.

I. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches (406 mm) o.c.

J. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking

is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal (38-mm actual) thickness.

3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
4. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.

K. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

L. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

M. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

N. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:

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1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

O. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

P. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.

1. Comply with **indicated** fastener patterns where applicable. **Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.**
2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.
3. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for[**screeding or**] attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

C. Provide permanent grounds of dressed, pressure-preservative-treated, key-beveled lumber not less than 1-1/2 inches (38 mm) wide and of thickness required to bring face of ground to exact thickness of finish material. Remove temporary grounds when no longer required.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal- (19-by-63-mm actual-) size furring **horizontally and vertically** at **24 inches (610 mm)** o.c.

C. Furring to Receive **Gypsum Board Plaster Lath**: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at **16 inches (406 mm)** o.c.

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3.4 INSTALLATION OF WALL AND PARTITION FRAMING

A. General: Provide single bottom plate and double top plates using members of 2-inch nominal (38-mm actual) thickness whose widths equal that of studs, except single top plate may be used for non-load-bearing partitions. Fasten plates to supporting construction unless otherwise indicated.

1. For exterior walls, provide **2-by-6-inch nominal- (38-by-140-mm actual-)** size wood studs spaced **16 inches (406 mm)** o.c. unless otherwise indicated.
2. For interior partitions and walls, provide **2-by-6-inch nominal- (38-by-140-mm actual-)** or **2-by-4-inch nominal- (38-by-89-mm actual-)** size wood studs spaced **24 inches (610 mm)** o.c. unless otherwise indicated.
3. Provide continuous horizontal blocking at midheight of partitions more than 96 inches (2438 mm) high, using members of 2-inch nominal (38-mm actual) thickness and of same width as wall or partitions.

B. Construct corners and intersections with three or more studs**, except that two studs may be used for interior non-load-bearing partitions**.

C. Frame openings with multiple studs and headers. Provide nailed header members of thickness equal to width of studs. Support headers on jamb studs.

1. For non-load-bearing partitions, provide double-jamb studs and headers not less than 4-inch nominal (89-mm actual) depth for openings 48 inches (1200 mm) and less in width,

6-inch nominal (140-mm actual) depth for openings 48 to 72 inches (1200 to 1800 mm) in width, 8-inch nominal (184-mm actual) depth for openings 72 to 120 inches (1800 to 3000 mm) in width, and not less than 10-inch nominal (235-mm actual) depth for openings 10 to 12 feet (3 to 3.6 m) in width.

2. For load-bearing walls, provide double-jamb studs for openings 60 inches (1500 mm) and less in width, and triple-jamb studs for wider openings. Provide headers of depth indicated.

3.5 INSTALLATION OF FLOOR JOIST FRAMING

A. General: Install floor joists with crown edge up and support ends of each member with not less than 1-1/2 inches (38 mm) of bearing on wood or metal, or 3 inches (76 mm) on masonry. Attach floor joists as follows:

1. Where supported on wood members, as indicated.
2. Where framed into wood supporting members, by using wood ledgers as indicated or, if not indicated, by using metal joist hangers.

B. Fire Cuts: At joists built into masonry, bevel cut ends 3 inches (76 mm) and do not embed more than 4 inches (102 mm).

C. Frame openings with headers and trimmers supported by metal joist hangers; double headers and trimmers where span of header exceeds 48 inches (1200 mm).

D. Do not notch in middle third of joists; limit notches to one-sixth depth of joist, one-third at ends. Do not bore holes larger than one-third depth of joist; do not locate closer than 2 inches (50 mm) from top or bottom.

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E. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist at ends of joists unless nailed to header or band.

F. Lap members framing from opposite sides of beams, girders, or partitions not less than 4 inches (102 mm) or securely tie opposing members together. Provide solid blocking of 2-inch nominal (38-mm actual) thickness by depth of joist over supports.

G. Anchor members paralleling masonry with 1/4-by-1-1/4-inch (6.4-by-32-mm) metal strap anchors spaced not more than 96 inches (2438 mm) o.c., extending over and fastening to three joists. Embed anchors at least 4 inches (102 mm) into grouted masonry with ends bent at right angles and extending 4 inches (102 mm) beyond bend.

H. Provide solid blocking between joists under jamb studs for openings.

I. Under non-load-bearing partitions, provide double joists separated by solid blocking equal to depth of studs above.

1. Provide triple joists separated as above, under partitions receiving ceramic tile and similar heavy finishes or fixtures.

J. Provide bridging of type indicated below, at intervals of 96 inches (2438 mm) o.c., between joists.

1. Diagonal wood bridging formed from bevel-cut, 1-by-3-inch nominal- (19-by-64-mm actual-) size lumber, double-crossed and nailed at both ends to joists.
2. Steel bridging installed to comply with bridging manufacturer's written instructions.

3.6 INSTALLATION OF CEILING JOIST AND RAFTER FRAMING

A. Ceiling Joists: Install with crown edge up and complying with requirements specified above for floor joists. Face nail to ends of parallel rafters.

1. Where ceiling joists are at right angles to rafters, provide additional short joists parallel to rafters from wall plate to first joist; nail to ends of rafters and to top plate, and nail to first joist or anchor with framing anchors or metal straps. Provide 1-by-8-inch nominal- (19-by-184-mm actual-) size or 2-by-4-inch nominal- (38-by-89-mm actual-) size stringers spaced 48 inches (1200 mm) o.c. crosswise over main ceiling joists.

B. Rafters: Notch to fit exterior wall plates and use metal framing anchors. Double rafters to form headers and trimmers at openings in roof framing, if any, and support with metal hangers. Where rafters abut at ridge, place directly opposite each other and nail to ridge member or use metal ridge hangers.

1. At valleys, provide double-valley rafters of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against valley rafters.
2. At hips, provide hip rafter of size indicated or, if not indicated, of same thickness as regular rafters and 2 inches (50 mm) deeper. Bevel ends of jack rafters for full bearing against hip rafter.

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C. Provide collar beams (ties) as indicated or, if not indicated, provide 1-by-6-inch nominal- (19-by-140-mm actual-) size boards between every third pair of rafters, but not more than 48 inches (1219 mm) o.c. Locate below ridge member, at third point of rafter span. Cut ends to fit roof slope and nail to rafters.

D. Provide special framing as indicated for eaves, overhangs, dormers, and similar conditions if any.

3.7 INSTALLATION OF TIMBER FRAMING

A. Install timber beams with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members unless otherwise indicated; tie together over supports as indicated if not continuous.

B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) airspace at sides and ends of wood members.

C. Install wood posts using metal anchors indicated.

D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.

3.8 INSTALLATION OF STAIR FRAMING

A. Provide stair framing members of size, space, and configuration indicated or, if not indicated, to comply with the following requirements:

1. Size: 2-by-12-inch nominal (38-by-286-mm actual) size, minimum.
2. Material: **parallel-strand lumber or solid lumber**.
3. Notching: Notch rough carriages to receive treads, risers, and supports; leave at least 3-1/2 inches (89 mm) of effective depth.
4. Spacing: At least three framing members for each 36-inch (914-mm) clear width of stair.

B. Provide stair framing with no more than 3/16-inch (4.7-mm) variation between adjacent treads and risers and no more than 3/8-inch (9.5-mm) variation between largest and smallest treads and risers within each flight.

3.9 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes **wet enough that moisture content exceeds that specified**, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

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END OF SECTION

SECTION 06 10 53

MISCELLANEOUS ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Miscellaneous rough carpentry.

B. Principle Products:
1. Lumber for blocking and nailers.
2. Wood panels for blocking and back boards.
3. Wood treatments.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with support and blocking requirements of subsequent Work.

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1.3 ACTION SUBMITTALS

A. Product Data: Rough carpentry materials.
1. Wood preservative treatment.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store lumber indoors, protected from elements.
2. Store lumber elevated above grade, protected from moisture.

PART 2 PRODUCTS

2.1 MATERIALS

A. Lumber: DOC PS 20. Grading rules certified by ALSC Board of Review.
1. Maximum Moisture Content: 19 percent.

B. Plywood: DOC PS 1, Exterior A-C, fire retardant treated.
1. Thickness: See Drawings.

C. Wood Preservative, Pressure Treatment: AWPA U1.
   1. Applications:
      a. Roofing and Exterior Wall Assemblies: Wood cants, nailers, curbs, and blocking; Category UC2.
      b. Concrete and Masonry Adjacent: Wood plates, sills, blocking, and furring; Category UC3b.
      c. Items shown on Drawings.
   2. Kiln dry after treatment.
      a. Lumber: 19 percent maximum moisture content.
      b. Plywood: 15 percent maximum moisture content.

2.2 INSTALLATION ACCESSORIES

A. Fasteners and Anchors:
   1. General: Follow requirements for wood member size and type.
      a. Preservative Treated Wood: Type 304 stainless steel.
      b. Other Applications: ASTM A153/A153M hot-dip galvanized.
   2. Nails, Brads, and Staples: ASTM F1667.
   3. Power-Driven Fasteners: NES NER-272.
   4. Wood Screws: ASME B18.6.1.
   5. Screws for Fastening to Metal Framing:
      a. Cold-Formed Metal Framing: ASTM C954.
      b. Other Metal Framing: ASTM C1002.
   6. Anchors:
      a. Toggle bolt type for anchorage to hollow masonry.
      b. Expansion shield and lag bolt type for anchorage to solid masonry or concrete.
      c. Bolt or ballistic fastener for anchorages to steel.

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B. Separation Layer: Butyl Rubber or Rubberized asphalt flashing sheet membrane.

PART 3 EXECUTION

3.1 INSTALLATION

A. Set members level and plumb, in correct positions.

B. Place horizontal members crown side up.

C. Construct curb members of solid wood sections.

D. Space framing and furring 16 inches on center.

E. Curb roof openings except where prefabricated curbs are used. Form corners by alternating lapping side members.

F. Coordinate curb installation with installation of decking and support of deck openings, roofing vapor retarder, and parapet construction.

G. Fasten plywood backing panels to substrate with fire retardant classification marking exposed to view; coordinate locations with equipment requiring backing panels.

H. Install continuous flexible flashing separator as follows:
   1. Wood Preservative Treated Lumber: Between wood and metal decking.
   2. Without Preservative Treatment: Between wood and concrete or masonry.

I. Follow AWPA M4 for site applied preservative treatment to cut surfaces of SBX preservative treated lumber.

3.2 PROTECTION

A. Protection: Protect SBX treated wood from weather. Apply EPA-registered borate treatment when inorganic boron treated wood becomes wet. Apply borate solution by spraying. Follow EPA-registered label requirements.

END OF SECTION

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DIVISION 6 – SHEATHING

SECTION 06 16 00

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wall sheathing.
2. Roof sheathing.
3. Parapet sheathing.
4. Composite nail base insulated roof sheathing.
5. Subflooring.
6. Underlayment.
7. Sheathing joint and penetration treatment.

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B. Related Requirements:

1. **Section 061000 "Rough Carpentry"** for plywood backing panels.
2. Section 072500 "Weather Barriers" for water-resistive barrier applied over wall sheathing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at **Project site**.

1. Review air-barrier and water-resistant glass-mat gypsum sheathing requirements and installation, special details, transitions, mockups, air-leakage testing, protection, and work scheduling that covers air-barrier and water-resistant glass-mat gypsum sheathing.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.

2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. For air-barrier and water-resistant glass-mat gypsum sheathing, include manufacturer's technical data and tested physical and performance properties of products.

B. Shop Drawings: For air-barrier and water-resistant glass-mat gypsum sheathing assemblies.

1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Product Certificates: From air-barrier and water-resistant glass-mat gypsum sheathing manufacturer, certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.

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C. Product Test Reports: For each air-barrier and water-resistant glass-mat gypsum sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated plywood.
2. Fire-retardant-treated plywood.
3. Foam-plastic sheathing.
4. Air-barrier and water-resistant glass-mat gypsum sheathing.

E. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.

1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.

B. Mockups: Build mockups to set quality standards for materials and execution.

1. Build integrated mockups of exterior wall assembly **as indicated on Drawings , 150 sq. ft. (14 sq. m)**, incorporating backup wall construction, window, storefront, door frame and sill, ties and other penetrations, and flashing to demonstrate crack and joint treatment and sealing of gaps, terminations, and penetrations of air-barrier sheathing assembly.

    a. Coordinate construction of mockups to permit inspection and testing of sheathing before external insulation and cladding are installed.
    b. Include junction with roofing membrane**, building corner condition,and foundation wall intersection**.
    c. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Testing Agency Qualifications:

1. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
2. For testing and inspecting agency providing tests and inspections related to air-barrier and water-resistant glass-mat gypsum sheathing: an independent agency, qualified according to ASTM E329 for testing indicated, and certified by Air Barrier Association of America, Inc.

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1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

B. Air-Barrier and Water-Resistant Glass-Mat Gypsum Sheathing Performance: Air-barrier and water-resistant glass-mat gypsum sheathing assembly, and seals with adjacent construction, shall

be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.2 WOOD PANEL PRODUCTS

A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.

C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 **for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground**.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

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B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: **Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing**.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.

2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D5516 and design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment shall be not less than span ratings specified. **For roof sheathing and where high-temperature fire-retardant treatment is indicated, span ratings for temperatures up to 170 deg F (76 deg C) shall be not less than span ratings specified.**

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: **Treat plywood indicated on Drawings, and the following:**

2.5 WALL SHEATHING

A. Plywood Sheathing: Per Structural drawings and General Notes.

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B. Oriented-Strand-Board: Per Structural drawings and General Notes.

C. Paper-Surfaced Gypsum Sheathing: ASTM C1396/C1396M, gypsum sheathing; with water-resistant-treated core and with water-repellent paper bonded to core's face, back, and long edges.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. American Gypsum.
   b. G-P Gypsum Corporation.
   c. LaFarge North America Inc.
   d. National Gypsum Company.
   e. Temple-Inland Inc.
   f. United States Gypsum Co.
2. Type and Thickness: Per architectural drawings.

D. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. CertainTeed Corporation; GlasRoc.
   b. G-P Gypsum Corporation; Dens-Glass Gold.
   c. National Gypsum Company; Gold Bond e(2)XP.
   d. Temple-Inland Inc.; GreenGlass
   e. United States Gypsum Co.; Securock.

2. Type and Thickness: Per architectural drawings.

E. Cellulose Fiber-Reinforced Gypsum Sheathing: ASTM C1278/C1278M, gypsum sheathing.

1. Product: Subject to compliance with requirements, provide "Fiberock Sheathing with Aqua-Tough" by United States Gypsum Co.
2. Type and Thickness: Per architectural drawings.
3. Size: Per architectural drawings.

F. Cementitious Backer Units: ASTM C1325, Type A.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. C-Cure; C-Cure Board 990.
   b. Custom Building Products; Wonderboard.
   c. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
   d. USG Corporation; DUROCK Cement Board.
2. Thickness: Per architectural drawings.

G. Extruded-Polystyrene-Foam Sheathing: ASTM C578, Type IV, in manufacturer's standard lengths and widths with tongue-and-groove or shiplap long edges as standard with manufacturer.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. DiversiFoam Products.
   b. Dow Chemical Company (The).
   c. Owens Corning.
   d. Pactiv, Inc.
2. Thickness: Per architectural drawings.

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H. Foil-Faced, Polyisocyanurate-Foam Sheathing: ASTM C1289, Type I or Type II, Class 2, rigid, cellular, polyisocyanurate thermal insulation. Foam-plastic core and facings shall have a flame-spread index of 25 or less when tested individually.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Atlas Roofing Corporation.
   b. Dow Chemical Company (The).
   c. Rmax, Inc.
2. Thickness: Per architectural drawings.

2.6 ROOF SHEATHING

A. Plywood Sheathing: Per Structural drawings and General Notes.

B. Oriented-Strand-Board: Per Structural drawings and General Notes.

2.7 SUBFLOORING AND UNDERLAYMENT

A. Plywood Combination Subfloor-Underlayment: Per the Structural Drawings and General Notes.

1. Span Rating: Per the Structural Drawings and General Notes.
2. Nominal Thickness: Per the Structural Drawings and General Notes.

3. Edge Detail: Tongue and groove.
4. Surface Finish: Fully sanded face.

B. Oriented-Stand-Board Combination Subfloor-Underlayment: Per the Structural Drawings and General Notes.

1. Span Rating: Per the Structural Drawings and General Notes.
2. Nominal Thickness: Per the Structural Drawings and General Notes.
3. Edge Detail: Square.
4. Edge Detail: Tongue and groove.
5. Surface Finish: **Fully sanded** face.

C. Plywood Subflooring: Per the Structural Drawings and General Notes.

1. Span Rating: Per the Structural Drawings and General Notes.
2. Nominal Thickness: Per the Structural Drawings and General Notes.

D. Oriented-Strand-Board Subflooring: Per the Structural Drawings and General Notes.

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1. Span Rating: Per the Structural Drawings and General Notes.
2. Nominal Thickness: Per the Structural Drawings and General Notes.

E. Underlayment, General: Provide underlayment in nominal thicknesses indicated or, if not indicated, not less than 1/4 inch (6.4 mm) over smooth subfloors and not less than 3/8 inch (9.5 mm) over board or uneven subfloors.

F. Plywood Underlayment for Resilient Flooring: DOC PS 1, **Exterior A-C** with fully sanded face.

G. Plywood Underlayment for Ceramic Tile: DOC PS 1, Exterior, C-C Plugged, not less than 5/8-inch (15.9-mm) nominal thickness.

H. Plywood Underlayment for Carpet: DOC PS 1, **Exposure 1, Underlayment**.

I. Hardboard Underlayment: ANSI A135.4, Class 4 (Service), Surface S1S; with back side sanded.

2.8 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

B. Nails, Brads, and Staples: ASTM F1667.

C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

D. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.

E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.

1. For steel framing less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C1002.
2. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C954.

G. Screws for Fastening Composite Nail Base Insulated Roof Sheathing to Metal Roof Deck: Steel drill screws, in type and length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B117. Provide washers or plates if recommended by sheathing manufacturer.

2.9 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

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A. Sealant for **Glass-Mat** Gypsum Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Section 079200 "Joint Sealants."

B. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

C. Sheathing Tape for Foam-Plastic Sheathing: Pressure-sensitive plastic tape recommended by sheathing manufacturer for sealing joints and penetrations in sheathing.

2.10 MISCELLANEOUS MATERIALS

A. Adhesives for Field Gluing Panels to Wood Framing: Formulation complying with **ASTM D3498** that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

1. Adhesives shall have a VOC content of **50** g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
2. Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
2. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in the ICC's International Residential Code for One- and Two-Family Dwellings.
3. ICC-ES evaluation report for fastener.

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D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.

E. Coordinate **wall and roof** sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 WOOD STRUCTURAL PANEL INSTALLATION

A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.

B. Fastening Methods: Fasten panels as indicated below:

1. Combination Subfloor-Underlayment:

a. **Glue and nail** to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

2. Subflooring:

a. **Glue and nail** to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

3. Wall and Roof Sheathing:

a. **Nail** to wood framing.
b. Screw to cold-formed metal framing.
c. Space panels 1/8 inch (3 mm) apart at edges and ends.

4. Underlayment:

a. **Nail** to subflooring.
b. Space panels 1/32 inch (0.8 mm) apart at edges and ends.
c. Fill and sand edge joints of underlayment receiving resilient flooring immediately before installing flooring.

3.3 GYPSUM SHEATHING INSTALLATION

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A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to wood framing with **screws**.
2. Fasten gypsum sheathing to cold-formed metal framing with screws.
3. Install panels with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.
4. Install panels with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.

E. Seal sheathing joints according to sheathing manufacturer's written instructions.

1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

3.4 CEMENTITIOUS BACKER UNIT INSTALLATION

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 FIBERBOARD SHEATHING INSTALLATION

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A. Comply with ASTM C846 and with manufacturer's written instructions.

B. Fasten fiberboard sheathing panels to intermediate supports and then at edges and ends. Use galvanized roofing nails; comply with manufacturer's recommended spacing and referenced fastening schedule. Drive fasteners flush with surface of sheathing and locate perimeter fasteners at least 3/8 inch (9.5 mm) from edges and ends.

C. Install sheathing vertically with long edges parallel to, and centered over, studs. Install solid wood blocking where end joints do not occur over framing. Allow 1/8-inch (3-mm) open space between edges and ends of adjacent units. Stagger horizontal joints if any.

D. Cover sheathing as soon as practical after installation to prevent deterioration from wetting.

3.6 FOAM-PLASTIC SHEATHING INSTALLATION

A. Comply with manufacturer's written instructions.

B. Foam-Plastic Wall Sheathing: Install vapor-relief strips or equivalent for permitting escape of moisture vapor that otherwise would be trapped in stud cavity behind sheathing.

C. Apply sheathing tape to joints between foam-plastic sheathing panels and at items penetrating sheathing. Apply at upstanding flashing to overlap both flashing and sheathing.

3.7 HARDBOARD UNDERLAYMENT INSTALLATION

A. Comply with CPA's recommendations and hardboard manufacturer's written instructions for preparing and applying hardboard underlayment.

1. Fastening Method: **Nail** underlayment to subflooring.

3.8 FIELD QUALITY CONTROL (BY OWNER)

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing:

1. Moisture Content of Building Materials: Building materials with visible signs of water damage shall not be installed. Wall and floor framing shall not be enclosed when the sheathing exceed 19-percent moisture content. Moisture content shall be verified in compliance with the following:

a. Moisture content shall be determined with either a probe-type or contact-type moisture meter. Equivalent moisture verification methods may be approved by the enforcing agency and shall satisfy requirements found in Section 101.8 of this code.
b. Moisture readings shall be taken at a point 2 feet to 4 feet from the grade stamped end of each piece to be verified.
c. At least three random moisture readings shall be performed on wall and floor framing with documentation acceptable to the enforcing agency provided at the time of approval to enclose the wall and floor framing.

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C. If test results or inspections show sheathing does not comply with requirements:

1. Provide additional drying time to sheathing until sheathing installation passes, and/or
2. Remove and replace sheathing until sheathing installation passes.

D. Proceed with installation of adjacent construction (cladding, building wraps, gypsum board, etc.) only after unsatisfactory conditions have been corrected.

E. Prepare test and inspection reports.

END OF SECTION

SECTION 06 20 00

FINISH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Interior finish carpentry.

B. Principal Products:
1. Interior finish carpentry.
2. Solid surfacing fabrications.
3. Wood treatments.

1.2 REFERENCES

1.3 ADMINISTRATIVE REQUIREMENTS

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A. Coordination Procedures:
1. Coordinate concealed framing and blocking locations for support and anchorage of finish carpentry.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.4 ACTION SUBMITTALS

A. Submittals - General: Follow AWI 100.

B. Product Data:
1. Fire retardant treatment.
2. Manufactured hardwood plywood.
3. Adhesives; include VOC content.
4. Shelf hardware.

C. Shop Drawings:
1. Dimensioned plans and elevations showing finish carpentry elements locations.
2. Show materials, profiles, assembly methods, joint details, fastening methods, hardware locations and sizes and locations of cutouts and finishes.

D. Samples:
1. Trim Profiles: 12 inch lengths.

1.5 INFORMATIONAL SUBMITTALS

A. Woodworker Quality Certificates: AWI Quality Certification Program.

B. Certification: Wood preservative treatment and fire retardant treatment and kiln drying.

1.6 CLOSEOUT SUBMITTALS

A. Warranty documentation.

1.7 QUALITY ASSURANCE

A. Qualifications:
   1. Fabricator: AWI Quality Certification Program participant.
   2. Installer: Woodwork fabricator.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage, Handling, and Acclimation Requirements: AWI 200.

1.9 FIELD CONDITIONS

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A. Interior Ambient Limitations:
   1. Interior Finish Carpentry: Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 INTERIOR FINISH CARPENTRY

A. Profiles: MMPA standard sizes and profiles shown on Drawings.

B. Moldings for Opaque Finish: MMPA WM 4 or HWM 4, P-Grade.
   1. Species: White pine, Southern pine, or yellow poplar or primed MDF.
   2. Maximum Moisture Content: 9 percent.
   3. Finger Jointing: Permitted.

2.2 PERFORMANCE

A. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.3 BASIC CARPENTRY MATERIALS

A. Softwood Lumber for Opaque Finish: DOC PS 20; C Select grade; any species.
   1. Cut: Plain sawn.
   2. Finger Jointing: Permitted.
      a. Exterior Applications: Made with waterproof glue.

B. Hardwood Lumber for Opaque Finish: Poplar or other close-grained species.
   1. Cut: Plain sawn.
   2. Finger Jointing: Permitted.

C. Lumber Moisture Content Range: 8 to 13 percent.

D. MDF: ANSI A208.2, Grade 130, made with binder containing no urea-formaldehyde resin.

2.4 INSTALLATION ACCESSORIES

A. Fasteners: Nails, screws, and other anchoring devices as required to provide inconspicuous, secure attachment.

B. Fasteners and Anchors:
   1. Nails and Staples: ASTM F1667.

C. Adhesive: Wood glue or multipurpose construction adhesive for interior general carpentry use.
   1. VOC Content: 70 g/L, maximum.

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D. Wood Filler: Tinted to match surface finish color.

E. Primer:
   1. See Section 099000.

2.5 FABRICATION

A. Ease edges to 1/16 inch radius.

B. Kerf backs or back out standing and running trim except where ends are exposed in finished Work.

C. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

2.6 FINISHES

A. Primer Materials: See Section 099000.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Examine wood before installation and discard materials that are wet, damaged, warped, or that exhibit mold.

3.2 PREPARATION

A. Prime paint surfaces of wood items and assemblies to be in contact with cementitious materials.

B. Material Acclimation: AWI 200.

3.3 INSTALLATION - GENERAL

A. Installation and Tolerances: ANSI/AWI 0620, Custom Grade.

B. Set and secure materials and components in place.

C. Scribe woodwork abutting other components.

D. Preparation For Site Finishing:
1. Countersink or set exposed fasteners; apply wood filler and sand smooth.
2. Site Finishing: See Section 099000.

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3.4 INSTALLATION - INTERIOR WOOD TRIM FOR PAINT FINISH

A. Back prime concealed faces and edges.

B. Install trim with minimum number of joints. Do not use pieces shorter than 36 inches except where wall surface is within that limit.

C. Scarf running joints.

D. Miter outside corners.

E. Plane backs of butt joint casings as needed for flush alignment of faces.

3.5 FIELD QUALITY CONTROL

A. Field inspection by Architect.

B. Non-Conforming Work: Remove and replace, and retest.

3.6 ADJUSTING

A. Touch up factory-applied primer to correct damage or staining.

B. Preparation for Site Finishing:
   1. Countersink or set exposed fasteners; apply wood filler and sand smooth.
   2. Clean surfaces that receive site finishing to remove dirt, stains, and incompatible substances.
   3. Site Finishing: See Section 099000.

END OF SECTION

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SECTION 06 40 00

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:

B. Principal Products:

1.2 REFERENCES

A. Abbreviations and Acronyms:
   1. HPDL: High Pressure Decorative Laminate.
   2. ABS: Acrylonitrile butadiene styrene.

B. Definitions:
   1. Sheen Levels: ASTM D523.
      a. Flat: Five gloss units at 60 degrees and 10 gloss units at 85 degrees, maximum.
      b. Satin: 20 to 35 gloss units at 60 degrees and 35 gloss units minimum at 85 degrees.
      c. Semigloss: 35 to 70 gloss units at 60 degrees.
      d. Gloss: 70 gloss units at 60 degrees, minimum.

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
   1. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets. with other work.

B. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

1.4 ACTION SUBMITTALS

A. Submittals - General: AWI 100.

B. Certification Labels or Certificates: AWI Quality Certification Program.

C. Product Data:
   1. Panel products.
   2. Adhesives.
   3. Manufactured trim profiles and ornamental components.
   4. Hardware.

5. Finish materials.
6. Shop primers.
7. Initial selection color Samples.

D. Shop Drawings:
1. Dimensioned plans and elevations showing architectural woodwork elements locations.
2. Show materials, profiles, assembly methods, joint details, fastening methods, hardware locations and sizes and locations of cutouts and finishes.

E. Samples:
1. Finished Material: Provide Samples for each profile.
a. Linear Elements: 12 inches long.
2. Plastic Laminates: 8 by 10 inches, minimum.
3. Hardware: Each type and finish.
4. Edge Material: Each type.

1.5 INFORMATIONAL SUBMITTALS

A. Woodworker Quality Certificates: AWI Quality Certification Program.

1.6 CLOSEOUT SUBMITTALS

A. AWI Quality Certification Program certificates confirming woodwork, including installation, follows duty level and specified grade requirements.

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1.7 QUALITY ASSURANCE

A. Qualifications:
1. Fabricator: AWI Quality Certification Program participant.
2. Installer: AWI Quality Certification Program participant.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements: AWI 200.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Manufacturers and Products: See Finish Schedule on Drawings.

2.2 WOODWORK GENERAL REQUIREMENTS

A. Quality Standard: Follow AWI Standards for aesthetic and performance grades.

B. Woodwork Grade: Custom.

2.3 INTERIOR TRIM - OPAQUE FINISH

A. Grade: Custom.

B. Interior Trim:
   1. Chair rails.

C. Material: MDF.

2.4 PLASTIC LAMINATE FACED CABINETS

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A. Wood Cabinets General Requirements: ANSI/AWI 0641.
   1. Duty Level: 3.

B. Aesthetic Grade: Custom.

C. Cabinet Construction: Frameless.

D. Panel Cores: Particleboard or MDF.

E. Door and Drawer Configuration: Flush overlay.
   1. Reveal Dimension: See Drawings.

F. Plastic Laminate:
   1. Manufacturers and Products: See Finish Schedule on Drawings.

G. Exposed Exterior and Exposed Interior Surfaces: High-pressure decorative laminate.
   1. Horizontal Surfaces Other Than Tops: Grade HGS.
   2. Postformed Surfaces: Grade HGP.
   3. Vertical Surfaces: Grade HGS.
   4. Edge Banding: 0.12 inch PVC edge banding matching exposed laminate.

H. Semi-Exposed Surfaces: Grade VGS HPDL.
   1. Edge Banding: 0.12 inch PVC edge banding matching exposed laminate.

I. Drawer Semi-Exposed Surfaces: Grade CLS HPDL faced panels.
   1. Edge Banding: 0.12 inch PVC edge banding matching exposed laminate.

J. Drawer Construction: Match cabinet duty level.
1. Box Material: Any product meeting performance requirements.
a. Thickness: 1/2 inch, minimum.
2. Joinery: Join drawer sides, backs, and subfronts with glued dovetail joints.

2.5 CABINET HARDWARE AND ACCESSORIES

A. General: BHMA A156.9 and ANSI/AWI 0641.

B. Cabinet Hinges: Concealed European self-closing type.
1. Opening Angle: 135 to 170 degrees.

C. Door and Drawer Pulls: See Finish Schedule on Drawings.

D. Cabinet Shelf Supports:
1. Shelf Standards and Brackets: BHMA A156.9, B54102 standards; with shelf brackets, B54112; match cabinet Duty Level.

E. Drawer Slides: BHMA A156.9. Side mounted; with polymer rollers or internal ball-bearing system, zinc-plated steel, full extension type.
1. Pencil Drawers 3 inches by 24 inches: Grade 2.
2. Box Drawers 6 inches by 24 inches: Grade 1.
3. File Drawers 12 inches by 24 inches: Grade 1HD-100.
4. Keyboard Slides: Grade 1.
5. Trash Bin Slides: Grade 1HD-100.

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F. Locks: Provide complete system for each lock, including removable lock core, cylinder body, and strike plates.
1. Cabinet Door Locks: BHMA A156.11, E07121.
2. Drawer Locks: BHMA A156.11, E07041.
3. Provide two keys for each lock.

G. Grommets: Plastic spring loaded cover and outer ring.
1. Color: Architect selected.

H. Hardware Finishes: BHMA A156.18.
1. Concealed Hardware: Manufacturer standard.

2.6 PERFORMANCE

A. Surface Burning Performance: ASTM E84 Class B.
1. Flame Spread Index: 75, maximum.
2. Smoke Developed Index: 450, maximum.

B. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design and ICC/ANSI A117.1.

2.7 MATERIALS

A. Wood Materials, General: AWI 300 for grade specified.

B. Panel Products:
   1. Hardwood Plywood, Veneer Core, and Veneers: ANSI HPVA HP-1.
   2. Particleboard: ANSI A208.1 Grade M-2 or better.
   3. Medium Density Fiberboard: ANSI A208.2, Grade 130.

C. Interior Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber.

D. High Pressure Decorative Laminate: ISO 4586-3.

E. Adhesives: Recommended by facing material manufacturers, complying with VOC limitations.

F. Fasteners: Type, size, and material to suit each application.

2.8 LUMBER AND PANEL MATERIAL TREATMENT

A. Wood Preservative Pressure Treatment:
   1. Interior Items: AWPA U1; Use Category UC2.

2.9 FABRICATION

A. Shop assemble Work for delivery to site, permitting passage through building openings.

B. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

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C. High-Pressure Decorative Laminate Finished Faces:
   1. Apply HPDL in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; conceal with concealed fasteners. Slightly bevel arises.
   2. Apply laminate backing sheet to reverse face of HPDL finished surfaces.

D. Fabrication Tolerances: ANSI/AWI 0641, specified grade.

2.10 FINISHES

A. Shop Priming: Prepare wood and shop prime materials with wood primer specified in Section 099000.

2.11 SOURCE QUALITY CONTROL

A. Inspections: By Architect.

B. Non-Conforming Work: Replace or refabricate, and reinspect.

C. Failed Test Retest Cost: Contractor responsibility.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with woodwork.

3.2 PREPARATION

A. Surface Preparation: ANSI/AWI 0620.

B. Conditioning:
   1. Acclimate products to installation environment per AWI 200 and ANSI/AWI 0620.

3.3 INSTALLATION - GENERAL

A. Follow ANSI/AWI 0620.

B. Installation Grade: Custom.

3.4 INSTALLATION

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A. Install woodwork plumb and level.
   1. Shim as required with concealed shims.

B. Scribe Work abutting other components. Gaps per ANSI/AWI 0620, specified aesthetic grade. Do not use additional overlay trim to conceal larger gaps.

C. Install trim with adhesive or fine, finishing nails.

D. Cabinets:
   1. Anchor wall cabinets per ANSI/AWI 0641, specified duty level.
   2. Secure cabinets to floor using appropriate angles and anchorages.
   3. Install finish hardware not installed in shop.

E. Site Finishing: Section 099000.

3.5 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Inspections provided through Architect. Program inspectors will perform installation inspection and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.

B. Non-Conforming Work: Remove and replace, and retest.

3.6 ADJUSTING

A. Test installed Work for rigidity and ability to support loads.

B. Lubricate and adjust hardware so doors and drawers operate smoothly.

3.7 CLEANING

A. Cleaning: Clean exposed and semi-exposed surfaces of woodwork.

B. Touch up shop-applied finishes. Replace damaged items that cannot be repaired.

3.8 PROTECTION

A. Protection: Protect installed woodwork from damage due to subsequent construction operations.

END OF SECTION

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SECTION 06 64 00

PLASTIC PANELING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Plastic paneling at food handling and custodial areas.

B. Principal Products:
1. Plastic sheet panels.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate plastic paneling with the following:
a. Sections 061053 and 092116 for blocking and nailers.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. For each type of product.

B. Samples:
1. Panel Material: Manufacturer standard size for each color and texture.
2. Trims: Manufacturer standard size for each color and profile.

1.4 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports: Manufacturer test results showing:
1. Verification of flame and smoke resistance per UL testing.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For plastic wall panels and accessories.

1.6 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

PART 2 PRODUCTS

2.1 PLASTIC SHEET PANELS

A. Source Limitations:
1. Provide panels and trim for each installation from single manufacturer.

B. Glass-Fiber-Reinforced Plastic Paneling: ASTM D5319 or ASTM D3841, gelcoat finish plastic panels.
1. Manufacturers and Products:
a. Arcoplast Inc.
b. Crane Composites, Inc. Glasbord.
c. Glasteel Glasliner.
d. Marlite.
e. Nudo Products, Inc.
2. Color: Architect selected.
3. Texture: Architect selected.

2.2 ACCESSORY MATERIALS

A. Trims: Panel manufacturer standard material and profiles.
1. Panel joint trims.
2. Inside and outside corners.
3. Termination Trims: J molding.
4. Colors: Match panel colors.

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B. Adhesives: Panel manufacturer recommended product, complying with VOC limitations.

C. Fasteners: Manufacturer recommended. Finish exposed fasteners to match panels.

D. Sealant: Mildew resistant silicone. See Section 079200.

E. Substrate Filler: Manufacturer recommended.

F. Substrate Primer: See Section 099000.

2.3 PERFORMANCE

A. Surface Burning: ASTM E84 Class A.
1. Flame Spread Index: 25, maximum.
2. Smoke Developed Index: 450, maximum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify substrates are ready to receive Work.

B. Gypsum Board: Verify that finishing compound is dried and sanded smooth.

3.2 PREPARATION

A. Removal: Remove wall coverings, loose or soluble paint, and other materials that would interfere with adhesive bond.

B. Fill cracks and smooth irregularities with filler, sand smooth. Vacuum clean surfaces.

C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings before preparing surfaces or finishing.

D. Conditioning:
   1. Condition product prior to installation.

3.3 INSTALLATION

A. Install panels with full bond to substrate.

B. Install trim accessories with adhesive. Do not fasten through panels.

C. Joints:
   1. Vertical joints only.
   2. Set joints 12 inches minimum from corners and terminations.
   3. Fill joints with manufacturer recommended sealant product prior to installation of panels.

D. Remove excessive adhesive during installation.

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E. Apply sealant to all trims, joints, and terminations per Section 079200.

3.4 CLEANING

A. Cleaning: Remove excess adhesive, dust, dirt, and other contaminants.
   1. Clean panels with manufacturer recommended cleaner.
   2. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

B. Reinstall wall plates and accessories removed before Work of this section.

END OF SECTION

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Thermal insulation to match existing insulation.
2. Thermal insulation to replace damaged existing insulation.
3. Thermal insulation at new construciton.

B. Principal Products:
1. Blanket insulation.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this section with wall and ceiling assemblies.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data.

1.4 INFORMATIONAL SUBMITTALS

A. Test and Evaluation Reports: Independent testing agency test results showing:
1. Thermal performance.
2. Surface burning characteristics.
3. Combustibility.
4. Density.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store insulation in dry location, protected from elements.
2. Handle insulation to prevent soiling and damage.

PART 2 PRODUCTS

2.1 BLANKET INSULATION

A. Unfaced Glass-Fiber Blankets: ASTM C665, Type I.
   1. Manufacturers and Products:
      a. CertainTeed Corporation Fiber Glass Building Insulation.
      b. Johns Manville Unfaced Fiber Glass Batts.
      c. Knauf Insulation EcoBatt Insulation.
      d. Owens Corning PINK Next Gen Fiberglas Insulation.
   2. Surface Burning Characteristics: ASTM E84.
      a. Flame Spread Index: 25, maximum.
      b. Smoke Developed Index: 50, maximum.
   3. Combustion: Passes ASTM E136.

2.2 LOOSE FILL INSULATION

2.3 INSULATION ATTACHMENT

A. Insulation Adhesives: Products compatible with insulation and substrates, capable of securing insulation to substrate without damaging insulation or substrates.

B. Mechanical Fasteners: Insulation manufacturer recommended screws with integrated insulation-retaining washers for attachment through sheathing to metal framing.

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C. Spindle-Type Adhered Anchors for Temporary Support During Installation: Galvanized steel plate with galvanized or copper-coated steel spindle.
   1. Manufacturers and Products:
      a. AGM Industries.
      b. Gemco.
      c. Gripnail.
      d. Midwest Fasteners.
      e. TRUFAST Walls.
   2. Spindle Length: Suited to insulation depth.

D. Insulation-Retaining Washers: Galvanized steel self-locking washers.
   1. Washer Size: Recommended by anchor manufacturer.
   2. Ceiling Plenum Applications: Self-locking dome cap for spindle ends.

E. Insulation Standoffs: Galvanized steel spacer fit over spindle providing a space between insulation and substrate.

F. Anchor Adhesive: Type recommended by anchor manufacturer for substrate.

G. Wire Mesh: 20 gauge galvanized wire hex netting with 2 inch openings.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean substrates and remove projections and appurtenances that may damage insulation or inhibit adhesion.

3.2 INSTALLATION - GENERAL

A. Extend insulation to cover entire area shown to be insulated.

B. Insulate tightly around obstructions and penetrations.

C. Fill voids with compressed fibrous insulation.

3.3 INSTALLATION OF FRAMED WALL INSULATION

A. Blanket Insulation: Fill cavities between framing members with insulation. Snugly fit insulation.
   1. Recessed Lighting Fixtures: Maintain 3-inch clearance between insulation and fixtures not rated for insulation contact.
   2. Wood-Framed Construction: ASTM C1320.
      a. Rafter and Joist Installation: Support insulation 24 inches on center, maximum and within 12 inches of each blanket end.
      b. Unfaced Blankets: Provide wire mesh, stapled or nailed to wood framing.
   3. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

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3.4 PROTECTION

A. Protect insulation from damage due to weather, ultraviolet radiation, physical abuse, and other causes. Provide temporary coverings or enclosures until permanent construction is completed.

END OF SECTION

SECTION 07 27 00

WEATHER BARRIERS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Continuous weather barrier membranes and accessories.

B. Principal Products:
1. Vapor permeable fluid applied membrane weather barrier.
2. Sheet weather barrier/ bond breaker.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate weather barrier installation with roofing, wall openings, and waterproofing installation.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees:
   a. Weather barrier substrate installers.
   b. Installers of items penetrating weather barriers.
   c. Adjacent roofing and waterproofing installers.
   d. Installers of storefront, window, and doors.
   e. Installers of cladding systems installed over weather barriers.
   f. Testing agency.
3. Additional Agenda Items:
   a. Substrate preparation.
   b. Transition detailing.
   c. Weather barrier protection and repair.
   d. Weather barrier testing and inspection.

C. Sequencing Procedures:
1. Complete weather barrier installation after roofing.
2. Ultraviolet exposure. Do not expose weather barrier materials to sunlight longer than manufacturer recommends.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Weather barrier membranes.
2. Primers.

B. Shop Drawings:
   1. Locations and extent of weather barriers.
   2. Termination conditions.
   3. Gap and expansion joint bridging.
   4. Interface with other assemblies and materials.
   5. Outside and inside corners.
   6. Penetration sealing.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates: Certify weather barrier membrane chemical and adhesive compatibility with adjacent and contacted materials.

B. Test and Evaluation Reports: Independent testing agency test results showing:
   1. Weather barrier performance.

C. Field Quality Control Submittals: Field test and inspection reports.

D. Qualification Statements: Installer.

1.5 CLOSEOUT SUBMITTALS

A. Warranty Documentation: For weather barriers.

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1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Installers:
      a. Weather Barrier Subcontractor: ABAA Accredited.
      b. Individual Installers: Manufacturer certified installers with a minimum of five years experience installing manufacturer's systems.
   2. Testing Agencies:
      a. Whole Building Testing Agencies: Firm employing individual certified by ABAA per ISO 17024.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store materials in their original undamaged packages in a clean, dry, protected location and within manufacturer recommended temperature range required.

1.8 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Ambient and Surface Temperature: Within manufacturer acceptable range.
   2. Precipitation and Fog: None occurring.

1.9 WARRANTY

A. Installer Warranty:
1. Weather Barrier Assembly: Warrant against installation failure.
a. Failure includes product disintegration, loss of airtight seal, loss of watertight seal, and adhesion failure.
b. Warranty Period: Ten years.

PART 2 PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Source Limitations: Obtain accessory products from same manufacturer as primary weather barrier.

2.2 VAPOR PERMEABLE FLUID APPLIED MEMBRANE WEATHER BARRIER

A. Weather Barrier: Silyl-terminated polyether polymer (STPE) based fluid applied membrane.
1. Manufacturers and Products:
a. Dupont Tyvek Fluid Applied WB+ as basis of design.
2. VOC Content: Maximum 2 percent g/L.
3. Accessories: Weather barrier membrane manufacturer recommended or approved primers, flashing, joint treatments, transition membranes, and reinforcing.

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2.3 VAPOR PERMEABLE SHEET WEATHER BARRIER/BOND BREAKER

A. Vapor Permeable Sheet Weather Barrier/Bond Breaker: Sheathing paper type membrane applied as weather barrier/bond breaker over fluid-applied air barrier where plaster cladding is scheduled.
1. Manufacturers and Products: Provide Henry Super Jumbo Tex 60 Minute asphalt saturated kraft Grade D sheathing paper, or approved equal.
2. Standards:
a. Federal Specification UU-B-790A, Type 1, Grade D, Style 2.
b. ASTM E2556, Type II.
3. Moisture Vapor Transmission: 10 perms minimum; ASTM E96.
4. Water Resistance: 60 minutes, ASTM D779.

B. Accessories:
1. Barrier Seam Tape: Pressure sensitive tape as recommended by membrane manufacturer.
2. Sealant: Type recommended by manufacturer. See Section 079200.

2.4 TRANSITION SEALERS

A. Transition Assemblies and Joint Sealants: Section 079200.

B. Provide transition components recommended by weather barrier manufacturer.

2.5 PERFORMANCE

A. Environmental Performance: Continuous weather resistive assembly acting in conjunction with adjacent materials to resist air and water leakage into the building and to function as a drainage plane for incidental moisture.
   1. Air Infiltration:
      a. Material: ASTM E2178, 0.004 cfm/sf at 1.57 lb/sq ft pressure differential, maximum.
      b. Assembly: ASTM E2357, 0.04 cfm/sf at 1.57 lb/sq ft.
   2. Vapor Permeance: ASTM E96 Desiccant Method, 10 perms, minimum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify surfaces are sound, dry, even, and free of contaminants.

B. Sheathing: Verify corners, and edges are securely fastened, with fasteners set flush.

3.2 PREPARATION

A. Protection of In-Place Conditions: Mask and cover adjacent surfaces to protect from overspray.

B. Surface Preparation: Clean and prepare substrates.
   1. Ensure that penetrating Work is in place and complete.
   2. Remove loose mortar, dust, oil, grease, oxidation, mill scale and other contaminants.
   3. Fill cracks, joints, and gaps with air barrier manufacturer recommended products.

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C. Gypsum Sheathing:
   1. Fill overdriven fastener holes.
   2. Seal exposed cut edges.

D. Priming: Prime substrate.

3.3 INSTALLATION - GENERAL

A. Coordinate the installation of weather barrier membrane with other building elements.
   1. Connect weather barrier to roofing and below grade waterproofing systems.
   2. Connect and seal weather barrier material to exterior door and storefront systems.

B. Fluid Applied Weather Barrier Installation: Apply weather barrier system using manufacturer recommended minimum thickness and coats to provide building envelope continuity.

C. Sheet Membrane Air Barrier Installation: Fasten sheet membrane to substrate; ensure continuous weather barrier configured to direct moisture to exterior.

D. Substrate Gaps and Joints: Bridge with manufacturer recommended transition membrane.
   1. Seal around penetrations with sealant.
   2. End of Day Procedure: Seal top edge of membrane with termination mastic.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.

B. Inspections: May include the following:
   1. Correct and complete substrate preparation and priming.
   2. Weather barrier continuity.
   3. Weather barrier support against substrate.
   4. Site conditions maintained within manufacturer limits.
   5. UV Exposure below manufacturer limits.
   6. Proper weather barrier installation.
   7. Adjacent material compatibility.
   8. Transitions at changes in direction and structural support at gaps have been provided.
   9. Connections between assemblies completed correctly.
   10. All penetrations have been sealed.

C. Testing: Tests may include the following:
   1. Air Leakage Location: Test per ASTM E1186, chamber pressurization or depressurization with smoke tracers.
   2. Assembly Weather Leakage: Test per ASTM E2357.
   3. Weather Barrier Adhesion: Test per ASTM D4541 or ABAA T002.

D. Non Conforming Work: Make corrections or replace, and retest.

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3.5 CLEANING

A. Cleaning: Clean spillage from adjacent construction.

3.6 PROTECTION

A. Protection: Protect weather barrier materials from damage until material is covered by permanent construction.
   1. Install cladding materials before exceeding material UV exposure limit.

END OF SECTION

SECTION 07 41 13

METAL ROOF PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Standing seam metal roof systems.

B. Principal Products:
1. Roof panels.
2. Trims, closures, and installation accessories.
3. Gutters and downspouts.

1.2 REFERENCES

1.3 ADMINISTRATIVE REQUIREMENTS

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A. Coordination Procedures:
1. Coordinate Work results of this Section with flashings and drainage Work.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Roofing system components and finishes.
2. Underlayment.
3. Initial selection color Samples.

B. Shop Drawings: Show material profile, seam spacing and details, fastening methods, flashings, terminations, and installation details.
1. Provisions for thermal expansion and contraction.
2. Fascia trim.
3. Built-in gutters and downspouts.
4. Built in gutters and their connections to drain piping.

C. Samples: Metal and finish, 8 by 10 inches, minimum.

1.5 INFORMATIONAL SUBMITTALS

A. Manufacturer Reports: Field inspection reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal finish.

B. Manufacturer warranty documentation.

1.7 QUALITY ASSURANCE

A. Qualifications:
1. Installers: Specializing in sheet metal roof fabrication and installation, approved or trained by manufacturer, with a minimum of 5 years experience in the installation of similar roof systems.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage. Provide waterproof coverings to prevent uneven weathering.

B. Prevent contact with discoloring or staining materials.

C. Retain strippable protective covering on metal roof panels during installation.

1.9 PROJECT CONDITIONS

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A. Do not install underlayment at ambient or surface temperatures less than 40 degrees F.

B. Do not install panels on wet or frozen substrates.

1.10 WARRANTY

A. Roofing System: Warrant system against damage under design wind conditions and water leakage through roof system.
1. Make repairs to roofing system required due to defects in materials or workmanship resulting in water leakage into or through roofing system.
2. Include labor and materials necessary to make required repairs.
3. Not limited to specific dollar amount.
4. Warranty Period: 20 years.

B. Finish Warranty: Repair deteriorated finishes or replace components.
1. Deterioration includes the following:
a. Color Fading: More than 5 Hunter units per ASTM D2244.
b. Chalking: More than No. 8 rating per ASTM D4214.
c. Paint cracking, peeling or checking.
2. Warranty Period: 35 years.

PART 2 PRODUCTS

2.1 MANUFACTURED METAL ROOF PANEL SYSTEM

A. Metal Roofing: Architectural standing seam panel roofing system with snap-on seam covers.
   1. Manufacturers:
      a. Petersen Aluminum Corporation PAC-CLAD Snap-Clad as basis of design.
      b. AEP Span.
      c. ATAS International, Inc. PC System.
      d. Berridge Manufacturing Co.
      e. Centria Architectural Systems.
      f. Fabral.
      g. Taylor Metal Products.
   2. Seam Height: Nominal 1-3/4 inch.
   3. Seam Spacing: Nominal 12 inches.
   4. Steel Panel System: ASTM E1514; galvanized steel, 0.028 inch thick minimum.
   5. Panel Surface: Smooth.
   6. Finish: PVDF coating system.
      a. Color: Architect selected.

B. Panel Clips: Hot-dip galvanized steel designed to fit between two adjacent panels and secure both panels.

C. Panel Fasteners: Hot-dip galvanized steel.

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D. Panel End Closures: Sponge neoprene, cut to fit panel configuration, 1 inch depth, minimum.

E. Sealant: Manufacturer recommended type.

2.2 MATERIALS

A. Coil Coated Aluminum Sheet: ASTM B209; alloy and temper as required for application and finish.

2.3 PERFORMANCE

A. Structural Design Criteria: See Structural Drawings.

B. Structural Loads: See Drawings and Applicable code compliant.

C. Withstand live loads stated on Structural Drawings without damage.

D. Resist loads from design wind speed stated on Structural Drawings without damage, including uplift.

E. Wind Uplift Rating: UL 508 class UL-90.

F. Environmental Performance:
   1. Air leakage: ASTM E1670, 0.06 cfm/sq ft, maximum, measured at reference differential pressure across assembly of 1.57 lb/sq ft.
   2. Water Leakage: ASTM E1646, no water at 2.86 psf test pressure difference.

3. Expansion and Contraction: Withstand 120 degree F ambient and 180 degree F surface thermal cycling without failure.

2.4 DESIGN CRITERIA

A. Design built-in gutters with outlet tubes coordinated with sizes and locations of storm drain piping.

2.5 INSTALLATION ACCESSORIES

A. Waterproof Underlayment: High temperature resistant, self-adhesive modified bitumen sheets recommended by manufacturer for use under metal roofing.
   1. Manufacturers and Products:
      a. Carlisle WIP 300HT.
      b. GCP Applied Technologies Grace Ice and Water Shield HT.
      c. Henry Company Blueskin PE200 HT.
      d. Owens Corning WeatherLock Specialty Tile & Metal.
      e. Polyglass Polystick P.

B. Splash Pans: Same metal type as downspouts, formed to 12 x 18 inch size; rolled sides.

C. Splash Pads: Precast concrete of sizes and profiles shown on Drawings; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

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2.6 FABRICATION

A. Fabrication Standard: SMACNA Architectural Sheet Metal Manual.

B. Form pieces in longest practical lengths.

C. Hem exposed edges on underside 1/2 inch; miter and seam corners.

D. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

E. Fabricate flashing and termination and fascia trim from same material as roof panels.

F. Fabricate gutters and downspouts from roof panel material per SMACNA recommendations.

G. Built-In Gutters: Fabricate from same material as roof panels.
   1. Hem exposed edges.
   2. Provide straps to support outer edge and provide continuous anchorage cleats.
   3. Rivet and seal seams watertight.
   4. Provide 4 inch outlet tubes of stainless steel with welded flanges riveted and sealed watertight to gutter body.
   5. Provide stainless steel wire guards in outlet tubes with clips that prevent accidental displacement but allow removal for cleaning.

H. Provide escutcheons for pipe and conduit penetrations.

2.7 ALUMINUM FINISHES

A. Color Coating: Two coat fluoropolymer finish with minimum 70 percent PVDF resin by weight in color coat; AAMA 2605.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect roof deck to verify deck is clean and smooth, free of depressions, waves, or projections, and properly sloped for drainage.

B. Verify deck is dry.

C. Verify joints in wood deck are solidly supported and fastened.

D. Verify roof openings, curbs, pipes, sleeves, ducts, or vents through roof are solidly set.

E. Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Fill knot holes and surface cracks with latex filler or cover with aluminum sheet to provide continuous support for underlayment.

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B. Broom clean deck surfaces.

3.3 INSTALLATION OF SELF-ADHESIVE UNDERLAYMENT

A. Retain strippable protective covering on metal roof panels during installation.

B. Apply primer if recommended by manufacturer.

C. Starting at low edge, apply one ply of underlayment horizontally over substrate and parallel to roof edge.

D. Weather lap each strip 6 inches minimum over previous strip.

E. Lap ends 6 inches minimum.

F. Press laps with roller for flat, full contact seams.

G. Apply second layer of full-width material centered on valleys and ridges.

H. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths. Seal ends and edges.

I. Extend minimum 6 inches up adjacent vertical surfaces.

3.4 INSTALLATION OF SYNTHETIC UNDERLAYMENT

A. Apply synthetic underlayment over areas not covered by waterproof underlayment.

B. Lap over waterproof underlayment minimum 4 inches in direction of water flow. Lap adjacent sheets minimum 2 inches.

C. Lay sheets in straight rows parallel to roof edge, and without wrinkles or fishmouths.

D. Secure underlayment to deck as recommended for use with metal roofing.

E. Repair tears and punctures.

3.5 INSTALLATION OF METAL PANELS

A. Install panels aligned and plumb.

B. Fasten panels to support with concealed fasteners.

C. Where panels cannot be installed in single lengths, align horizontal lap seams with alternating lengths between adjacent panels.

D. Install trim to maintain visual continuity of system in flat surfaces free of buckling or oilcanning.

E. Apply trim and flashing with screws for secure, weatherproof performance.
   1. Where fasteners have to be exposed on trim or flashings, use fasteners with heads finished to match panels and with neoprene washers.

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F. Install joint sealers and gaskets to prevent water penetration.

G. Flash penetrations through roofing with metal trim to match panels:
   1. Lap flashings over roof panels 12 inches minimum on all sides and seal with double bead of sealant.
   2. Install metal draw band and sealant at top of pipe penetrations.
   3. Install water diverters at uphill side of square and rectangular penetrations.

H. Installation Tolerances:
   1. Variation from Location: Plus or minus 1/4 inch.
   2. Variation from Plane: 1/4 inch in 10 feet.
   3. Misalignment of Horizontal Lap Seams: 1/4 inch.

3.6 INSTALLATION OF RAIN DRAINAGE COMPONENTS

A. Built-In Gutters:
   1. Provide continuous slip sheet of rosin paper or other product recommended by roofing system manufacturer on support surfaces below gutters.
   2. Install gutters to allow thermal expansion from fixed outlet tubes.
   3. Make watertight connections to rain drain piping.

B. Downspouts:
   1. Join sections with telescoping joints.
   2. Attach downspouts with brackets that hold downspout 1 inch from wall; locate brackets with equal spacing that does not exceed 5 feet.

3.7 PROTECTION

A. Do not permit traffic over unprotected roof surface.

END OF SECTION

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SECTION 07 42 33

PLASTIC WALL PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Composite plank wall panels in vertical and horizontal applications.

B. Principal Products:
1. Exterior solid high pressure laminate phenolic composite panel.
2. Mounting accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings:
1. Show fabrication and installation layouts including direction of direction of wood grain finish on panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.

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C. Samples:
1. Panels: Minimum 12 inches by 12 inches. Include fasteners and other wall panel accessories.
2. Accessories: 12 inch long Samples for each type of accessory.

1.3 QUALITY ASSURANCE

A. Build mockups to set quality standards for materials and execution and to set quality standards for fabrication and installation.
1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit operation, maintenance, and cleaning information for products covered under this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with labels intact until time of use.

B. Store materials on elevated platforms, under cover, and in a dry location.

C. Handling:
1. Remove protective film within 24 hours of the panels being removed from the pallet.
2. When moving panels, lift evenly to avoid dragging panels across each other and scratching the decorative surface.
3. Remove all labels and stickers immediately after installation.

1.6 PROJECT CONDITIONS

A. Maintain environmental conditions, temperature, humidity, and ventilation, within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer absolute limits.

B. Field Measurements: Verify actual measurements/openings by field measurements performed by the installer. Recorded measurements to be indicated on drawings based on field measurements provided by the installer.

1.7 WARRANTY

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A. Special Warranty: Manufacturer standard form in which manufacturer agrees to repair or replace components of material panel systems that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Structural failures including rupturing, cracking, or puncturing.
2. Warranty Period: Ten years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 SOLID HIGH PRESSURE LAMINATE PHENOLIC WALL PANEL

A. Solid High Pressure Laminate Phenolic Wall Panels: High pressure laminate flat panel from thermosetting phenolic resins, homogenously reinforced with natural wood-based fibers and an integrated decorative surface or printed décor.
1. Basis of Design: Trespa North America Trespa Pura.
2. Panel Core: Fire retardant core.
3. Panel Thickness: See Drawings.
4. Finish Performance: See Drawings.
a. Color: See Drawings.
5. Fire Performance:
a. Flame Spread: Class A, Less than 25, ASTM E 84.
b. Smoke Development: Less than 450, ASTM E 84.

B. Configurations:
   1. Vertical orientation as wall cladding.
   2. Horizontal orientation as soffit.

C. Mounting System:
   1. Flush Siding System.
   2. Concealed fastening: Manufacturer recommended clip system. See Drawings.
   3. Fastener Mounting: Fasetner mounted direct to substrate. Fasteners as recommended by manufacturer.

D. Sub Structure:
   1. Sub-structure designed to withstand structural loading due to wind load and the dead load of the panel, finished as required to conceal behind the joinery of the attachment system.
   2. Extrusions, battens, including corner closures, joint closures and vent screens, formed members, sheet, and plate shall conform with the recommendations of the manufacturer.

E. Fasteners: Non-corrosive.

F. Accessories: Manufacturer standard components as required for complete installation.
   1. Extruded aluminum trim includes outside corners, inside corners, start profiles, j channel, and finish profiles.
   2. Colors as selected by Architect at each applications.

2.2 FABRICATION

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A. Fabricate solid phenolic wall panels and accessory items in accordance with manufacturer recommendations and approved submittals.

B. Fabricate panels to profiles indicated.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of walls and soffits.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Comply with manufacturer instructions and local building code.

B. Install plumb and level and accurately spaced in accordance with manufacturer recommendations and approved submittals and drawings.

C. Anchor siding panels and sub-framing securely per engineering recommendations and in accordance with approved shop drawings to allow for necessary movement and structural support.

D. Anchor soffit panels to support structure as shown on Drawings and as recommended by manufacturer.

E. Fasten panels with fasteners approved for use with supporting substrate.

F. Do not install defective or damaged panels or component parts including, but not limited to: warped, bowed, abraded, scratched, and broken members.

G. Do not cut or trim component system parts during installation in a manner that would damage the finish, decrease the strength, or result in visual imperfection or a failure in performance. Return component system parts with require alteration to the shop for re-fabrication or replacement.

H. Install corner profiles and trim with fasteners appropriate for use with adjoining construction on Drawings and as recommended by manufacturer.

3.4 ADJUSTING AND CLEANING

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A. Remove masking or panel protection as soon as possible after installation. Any masking intentionally left in place after panel installation on an elevation, shall become the responsibility of the Installing Contractor to remove.

B. Adjust final panel installation so that all joints are true and even throughout the installation. Panels out of plane shall be adjusted with the surrounding panels to minimize any imperfection.

C. Repair panels with minor damage. Remove and replace panels damaged beyond repair as a direct result of the panel installation.After installation, panel repair and replacement shall become the responsibility of the Installing Contractor.

D. Clean finished surfaces as recommended by panel manufacturer. After installation cleaning and cleaning during construction shall become the responsibility of the Installing Contractor.

END OF SECTION

SECTION 07 46 46

FIBER-CEMENT SIDING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Exterior cementitious cladding.

B. Principal Products:
1. Fiber cement panel siding.
2. Trims and installation materials.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate siding installation with air barriers, flashing, and other adjoining Work.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Air barrier installers.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Materials, component profiles, fastening methods, jointing details, sizes, surface texture, finishes, and accessories.

B. Shop Drawings: Detail the following:
1. Fabrication and installation layouts.
2. Edge conditions at openings and corners.
3. Penetrations.
4. Flashing, trim and anchorage.

C. Samples:
1. Panel Siding: 12 by 12 inches.
2. Trim: 12 inch long by actual width.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates:
1. Product Certificates: For type of fiber-cement siding.

B. Test and Evaluation Reports: Independent testing agency test results for fiber-cement siding.

C. Delegated Design Submittals:
   1. Design for installation system, support girt system, and anchorage to substrate.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Product and accessories, include in maintenance manual.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Installers: Experienced in the Work of this Section.
   2. Licensed Professionals: Licensed in the state where project is located.

1.7 MAINTENANCE MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish full lengths of fiber-cement siding, including related accessories, in a quantity equal to 2 percent of the amount installed.

1.8 WARRANTY

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A. Manufacturer Warranty:
   1. Fiber-Cement Siding : Warrant against product and installation failure.
      a. Failure includes structural failure and deterioration of materials.
      b. Warranty Period: 30 years.
      c. Dollar Limit: None.

PART 2 PRODUCTS

2.1 FIBER-CEMENT PANEL SIDING

A. Fiber-Cement Panels: ASTM C1186, Grade II minimum, Type A.
   1. Manufacturers and Products:
      a. Provide products shown in Materials Schedule on Drawings or approved comparable products by one of the following:
      b. JamesHardie HardiePanel Architectural Panels.
      c. American Fiber-Cement Corp. Through Color High Density.
      d. Nichiha Fiber-Cement NichiPanel.
      e. Swisspearl Group.
      f. EQUITONE.
   2. Panel Sizes: See Drawings.
   3. Thickness: Manufacturer standard for basis of design product.
   4. Texture: Sand.
   5. Finish: Through color.
      a. Color: See Drawings.

b. Add manufacturer standard or recommended graffiti resistant coating.

B. Fiber-Cement Trim: Siding manufacturer matching products.
1. Trim Sizes: See Drawings.
2. Texture: Match panels.
3. Finish: Factory baked on paint.
a. Color: Match siding.

2.2 INSTALLATION COMPONENTS

A. Furring Strips: Preservative treated lumber. See Section 061053.

B. Non Permeable Membrane: Manufacturer recommended product for covering furring strips.

C. Starter Bars, Panel Clips, and Corner Clips: Panel manufacturer recommended products.

D. Fasteners: Type recommended by siding manufacturer; hot dip galvanized steel, heads colored to match fiber-cement finish.

E. Flashing: See Section 076200.

F. Sealant: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.

G. Touch-Up Paint: Panel manufacturer recommended product, matching panel color.

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2.3 PERFORMANCE

A. Fire Performance:
1. Surface Burning: 25, maximum per ASTM E84.
2. Smoke Developed Index: 50, maximum per ASTM E84.
3. Fire Rated Walls: Testing agency listed assembly requirements.
4. Exterior Wall Testing: Exterior wall assembly tested per NFPA 285.

B. Environmental Performance:
1. Expansion and Contraction: Withstand 120 degree F ambient and 180 degree F surface thermal cycling without failure.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
1. Verify substrate installation and air barrier application is complete and tested per Section 072700.
2. Verify framing members are ready to receive fiber-cement siding systems.
3. Verify penetrations are complete and securely fastened.

3.2 PREPARATION

A. Installation Direct to Sheathing:
   1. Mark stud locations with chalk lines.
   2. Install preservative treated wood furring behind fiber-cement products.

3.3 INSTALLATION - PANEL SIDING

A. General:
   1. Comply with manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

B. Install starter strips recommended by panel manufacturer.

C. Install fiber-cement panels in locations, spacings, and orientations shown on Drawings. Anchor panels securely.

D. Accommodate thermal and structural movement without failure.

E. Flashing and Trim: Install with concealed fasteners for secure, waterproof performance. Direct water to exterior.

F. Paint field-cut edges to match factory finish.

G. Erection Tolerances:
   1. Offset Between Adjacent Members: 1/16 inch, maximum.
   2. Variation from Plane or Location: 1/4 inch in 20 feet, maximum.

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3.4 INSTALLATION - TRIM

A. Install trim plumb, level, and accurately aligned.

B. Apply sealant to joints between siding and trim and between trim pieces.

C. Face screw trim to furring.

D. Corners: Miter joints.

E. Paint field-cut edges to match factory finish.

3.5 CLEANING

A. Protect installed products. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07 50 00

MEMBRANE ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Membrane roofing systems.

B. Principal Products:
1. Roofing membrane.
2. Vapor retarders.
3. Cover board.
4. Insulation.
5. Flexible walkways.

1.2 REFERENCES

A. Definitions:
1. Roofing Terminology: See ASTM D1079 and the NRCA Roofing and Waterproofing Manual glossary.

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with adjoining work, penetrations, and air barriers.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Agenda Items:
a. Preparation procedures.
b. Installation procedures.
c. Coordination and scheduling required with related Work.
d. Protection of construction and site.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Roofing membrane and accessory products.
2. Vapor retarders.
3. Roof insulation and cover board.
4. Roof walkway material.

B. Shop Drawings: Include the following:
   1. Layout and thickness of insulation.
   2. Base and sheet flashings and membrane termination details.
   3. Flashing details at penetrations.
   4. Tapered insulation layout, thickness and slopes.
   5. Roof plan showing orientation of roof deck and orientation of roof membrane, fastening spacings and pattern for corner, perimeter and field-of-roof locations.
   6. Insulation fastening patterns for corner, perimeter and field-of-roof locations.
   7. Crickets, saddles and tapered edge strips, including slopes.
   8. Tie-in with adjoining wall system.

C. Samples:
   1. Membrane Sheet: 6 by 6 inch sample of each type and color.
   2. Flexible walkway materials, color samples.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Statements:
   1. Installer: Manufacturer authorization.

B. Certificates: Manufacturer affidavit that Project design and conditions have been reviewed and that the installation will be fully warrantable if correctly installed. This submittal may be in the form of a photocopy of manufacturer authorization to Installer to proceed with installation.

C. Special Warranty Certificate: Signed by roofing membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

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D. ICC-ES test and evaluation reports for roofing system components.

E. Product Test Reports for roofing system components, performed or witnessed by a qualified testing agency.

F. Field Quality Control Submittals: Field test and inspection reports.

G. Manufacturer Reports: Field quality control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Roof system maintenance requirements.

B. Warranty Documentation: For complete roof system.

C. Project Plaque: Provide permanent sign or framed document with the following information attached to wall near primary access to main roof.
   1. Roofing installer name, address, and telephone number.
   2. Roofing system manufacturer name, address, and telephone number.
   3. Starting date of warranty and length of warranty period.

1.7 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturers: UL listed and FM Global approved for roofing system.
2. Installer: Licensed, authorized, or approved by roofing manufacturer to install manufacturer roofing system and provide full specified warranty.
3. Testing Agencies: Acceptable to authority having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements: Store roofing system components protected from the elements, precipitation and standing water, freeze/thaw cycling, and protected from sunlight, if required.

B. Comply with the manufacturer's written instructions for proper material storage.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within limitations recommended by manufacturer.

1.10 WARRANTY

A. Manufacturer Warranty: Warrant roofing system against failure.
1. Total System Warranty: Include primary roof membrane and vapor retarder, roof insulation, cover boards, and flashings, and other components of roofing system.
a. Warranty Period: 20 years.
b. Dollar Limit: None.

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PART 2 PRODUCTS

2.1 TPO ROOFING

A. TPO Sheet: ASTM D6878, scrim or fabric internally reinforced, fabric backed.
1. Manufacturers:
a. Carlisle SynTec Incorporated Sure-Weld APEEL as basis of design.
b. GAF Materials Corporation.
c. GenFlex.
d. Holcim Elevate.
e. Johns Manville.
f. Versico.
2. Membrane Thickness: 60 mils.
3. Exposed Face Color: White.
4. Breaking Strength (ASTM D 751): 250 lbf/in.
5. Tear Resistance (ASTM D 751): 55 lbf/in.
6. Elongation (ASTM D 751): 25 percent.

2.2 COMPONENT MATERIALS

A. General: Provide components of roofing system recommended by manufacturer for a complete system.
   1. Component Materials: Compatible with each other and adjacent materials.

B. Base Flashing: Provide a waterproof, fully adhered base flashing system at all penetrations, plane transitions and terminations.

C. Flexible Flashing: Same material as roofing membrane, manufacturer recommended thickness.
   1. Corners: Inside and outside corners, 60 mil thickness, color to match membrane.

D. TPO T-Joint Covers: Injection molded 60 mil thick TPO formed into a 4.5 inch diameter circle used to seal step-offs at splice intersections. Color to match membrane.

E. Molded Pipe Seals: A pre-molded flashing and clamping ring used for pipe penetrations, color to match membrane.

F. Lap Joint Sealant: Manufacturer standard, color to match membrane.

G. Butyl Mastic: Manufacturer standard water stop mastic.

H. Termination Bars: Manufacturer standard stainless steel, pre-drilled for included anchors.

I. Battens: Manufacturer standard, pre punched, steel sheet, with aluminum-zinc alloy or zinc coating.

J. Fasteners: Compliant with FM Global 4470 for corrosion resistance, including metal or plastic washers, and acceptable to roof system manufacturer.
   1. Fasteners and accessories recommended by membrane manufacturer for a complete installation.

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K. Flashing Accessories: Prefabricated or field fabricated boots, corners, cones, pipe seals, and other shapes required for complete roof system installation, compatible with primary roof membrane.
   1. Colors: Match roofing membrane color.

L. Terminations: SecurEdge 200: A snap-on edge system consisting of a galvanized metal water dam.

M. Accessories: Miscellaneous reinforcing, sealants, and other items recommended by manufacturer for complete roof system installation.

2.3 VAPOR RETARDER

A. Standard Sheet: ASTM D4397, polyethylene.
   1. Thickness: Minimum 6 mils thick.
   2. Permeance: 0.13 perms, maximum.
   3. Tape: Manufacturer standard or recommended pressure sensitive tape.
   4. Adhesive: manufacturer standard adhesive.

2.4 ROOF INSULATION

A. General: Roof insulation, preformed boards, manufactured or approved by roof membrane manufacturer, manufacturer standard sizes, thicknesses as shown on Drawings.

B. Polyisocyanurate Board Insulation: ASTM C1289, Type II, Class 1, Grade 3.
   1. Manufacturers:
      a. Atlas Roofing Corporation.
      b. Carlisle SynTec Incorporated.
      c. GAF Materials Corporation.
      d. Holcim Elevate.
      e. Hunter Panels.
      f. Insulfoam LLC.
      g. Johns Manville.
      h. Rmax, Inc.
      i. Sika.
   2. Thickness: Manufacturer minimum and maximum allowed per layer.

C. Tapered Insulation: Factory formed, tapered insulation boards, 1/4 inch per foot slope or as shown on Drawings.

D. Special Shapes: Provide preformed insulation shapes to form crickets, saddles, tapers, and other shapes to facilitate drainage.

E. Fasteners: FM Global 4470 compliant for corrosion resistance, including metal or plastic washers.

2.5 COVER BOARDS

A. Water Resistant Gypsum Board: ASTM C1177 or ASTM C1278, 1/2 inch thick.
   1. Manufacturers and Products:
      a. Georgia-Pacific Corporation DensDeck Prime with Eonic Technology.
      b. National Gypsum Company DEXcell FA Glass Mat Roof Board.
      c. USG Corporation Securock Gypsum-Fiber Roof Board.

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2.6 WALKWAYS

A. Walkway Rolls: Sure-Weld Heat Weldable Walkway Rolls, color to match membrane.

2.7 SUSTAINABILITY CHARACTERISTICS

A. Roof Membranes:
   1. Solar Reflectance Index: ASTM E1980; 78 minimum, based on testing of identical products by a qualified testing agency.
   2. Energy Performance: ANSI/CRRC S100, roofing system minimum solar reflectance of not less than 0.70 and minimum emissivity of 0.75.

2.8 PERFORMANCE

A. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated.
   1. Identify products with appropriate markings of applicable testing agency.

B. Cool Roof Rating Council (CRRC): Roofing system to be listed by the CRRC for low-slope roof products.

C. Accelerated Weathering: ASTM G152, ASTM G154 or ASTM G155; withstand 2,000 hours of testing.

D. Impact Resistance: ASTM D3746 or ASTM D4272.

E. Compatibility: Roof system materials are to be compatible within themselves and with all adjacent material as installed.

F. Roof System Design: Certified by testing to FM 4474, UL 580 or UL 1897 to resist uplift pressures as shown on Structural Drawings.

G. FM Approvals Listing: Roofing system and components follow requirements of FM Global 4450 or FM Global 4470, and must be listed in FM Approvals RoofNav for Class 1 noncombustible construction. Materials are to retain FM Approvals markings.

H. Fire/Windstorm Classification: Class 1A-75.

I. Hail Resistance Rating: VSH per FM Global Property Loss Prevention Data Sheet 1-34.

J. Exterior Fire Test Exposure: ASTM E108 or UL 790 testing by a qualified testing agency, Class A, products marked as compliant by testing agency.

PART 3 EXECUTION

3.1 EXAMINATION

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A. Examine and verify conditions for compliance with roof system manufacturer recommendations:
   1. Substrate.
   2. Roof openings and penetrations.
   3. Curbs, nailers, and cants.

3.2 PREPARATION

A. Clean and prepare substrate per manufacturer written instructions.

B. Protect roof drainage and other equipment and surfaces from roofing materials.

C. Acoustical Deck Insulation: Install insulation strips in roof deck ribs per deck manufacturer instructions.

3.3 ROOFING INSTALLATION - GENERAL

A. Install roofing system materials and components in accordance with roofing system manufacturer's written installation instructions, SPRI's "Directory of Roof Assemblies" listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations, flashings, roofing installation, and temporary measures by end of each workday and during rain events.

C. Tie in to Existing Roof Systems: Use only compatible materials, maintaining weathertight condition and existing warranties.

3.4 INSTALLATION - VAPOR RETARDER

A. Polyethylene Film: Loosely lay polyethylene film vapor retarder in place, lapping sides minimum 2 inches and ends of each sheet a minimum of 6 inches. Seal side and end laps.

B. Install vapor retarder to provide complete seal against air movement at penetrations and terminations.

3.5 INSTALLATION - INSULATION

A. Do not allow insulation to be exposed to precipitation or left exposed at the end of the workday.

B. Install tapered insulation under area of roofing to conform to slopes shown on Drawings.

C. Install insulation to required thickness. Install in layers with joints staggered from previous layer 6 inches in each direction, minimum.

D. Install insulation with long sides in straight rows with end joints staggered between rows, butt joints at edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.
   1. Fit insulation by trimming, within 1/4 inch of nailers, obstructions, and penetrations.
   2. Trim and fit insulation at roof drains.

E. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board type roof insulation to deck type.
   1. Fasten insulation per FM Global RoofNav for specified Windstorm Resistance Classification.
   2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

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3.6 INSTALLATION - COVER BOARD

A. Install cover boards over insulation with long sides in straight lines and end joints staggered between rows. Offset joints from insulation layer below a minimum of 6 inches in each direction. Loosely butt cover boards together and fasten to roof deck.
   1. Fasten cover boards per FM Global RoofNav for specified Windstorm Resistance Classification.
   2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.7 INSTALLATION - MECHANICALLY FASTENED ROOFING MEMBRANE

A. Unroll membrane roofing and allow to relax before installing.

B. Start installation of roofing in presence of roofing system manufacturer technical personnel.

C. Accurately layout roofing, maintaining side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Mechanically fasten or adhere roofing securely at terminations, penetrations, and perimeter of roofing.

E. Apply roofing with uphill side laps overlapping lower layers with slope of roof deck where possible.

F. Repair tears, voids, lapped seams, or defects in roofing that do not follow requirements.

G. Spread sealant or mastic bed over deck drain flanges at roof drains, and securely seal membrane roofing in place with clamping ring.

H. In-Splice Attachment: Secure one edge of roofing using fastening plates or metal battens centered within splice, then mechanically fasten to roof deck. Field splice seam.

I. Through-Membrane Attachment: Secure roofing using fastening plates or metal battens, and mechanically fasten roofing to roof deck. Cover battens and fasteners with a continuous cover strip.

3.8 MEMBRANE SEAMING

A. Heat Welded Seam Installation: Heat weld seams using methods and equipment recommended by membrane manufacturer.

B. Leave seams uncovered until they are inspected by manufacturer technical representative.

3.9 INSTALLATION - BASE FLASHING

A. Adhere flashings and flashing accessories to substrates.

B. Apply adhesive to substrate and underside of sheet flashing, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field formed inside and outside corners per roofing manufacturer recommendations.

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D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets per manufacturer requirements. Seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate using termination bars.

3.10 INSTALLATION - WALKWAYS

A. Flexible Walkways: Adhere walkway components to substrate by heat welding or with compatible adhesive.

3.11 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.
   2. Do not begin construction until inspectors have verified compliance of materials.
   3. Do not use materials that fail tests and inspections.

B. Inspections: Continuous during application.
   1. Substrate conditions.
   2. Substrate preparation.
   3. Vapor barrier application, if required.
   4. Membrane application.

5. Flashings.
6. Protection components.
7. Penetrations and drainage components.
8. Furnish reports to Architect.

C. Final Roof Inspection: Arrange for roofing system manufacturer or testing agency to inspect completed roofing installation.

D. Repair or remove and replace roofing system components that fail tests or do not follow requirements.

3.12 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period.

B. Sweep roof surface; remove loose fasteners, rocks, and other items that might damage membrane.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

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SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Sheet metal flashing and trim.

B. Principal Products:
1. Flashings.
2. Trims.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with exterior systems.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Coil-coated sheet metal.
2. Initial selection color charts and Samples.

B. Shop Drawings.
1. Show fabrication and profiles for each item.
2. Show base metals, thicknesses, and finishes.
3. Include attachment and connection details.
4. Include details for corners, changes in plane, expansion joints, and terminations.
   a. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, counterflashings, special conditions and connections to adjoining work.
5. Show locations of expansion joints.
6. Copings and Roof Edge Fascia Trim: Include NRCA tested design information.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates:
1. Certify copings and roof edge fasciae trim are ANSI/SPRI/FM 4435 ES-1 tested.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: Coil coated sheet metal.

B. Warranty Documentation: Coil-coated sheet metal finish, Roof edge warranty, and Coping warranty.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Fabricators: Listed by UL, FM, or other agency acceptable to authority having jurisdiction to fabricate copings and roof edge fascia per NRCA tested designs to meet ANSI/SPRI/FM 4435 ES-1 securement requirements.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store sheet metal elevated above grade, protected from precipitation and stormwater runoff.
   2. Handle fabrications to prevent twisting, bending, and abrasion.
   3. Prevent contact with materials causing discoloration or staining.

1.8 WARRANTY

A. Include roof edges and coping in warranty for roofing system specified in Section 075000.

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B. Finish Warranty: Repair deteriorated finishes or replace components.
   1. Deterioration includes the following:
      a. Color Fading: More than 5 Hunter units per ASTM D2244.
      b. Chalking: More than No. 8 rating per ASTM D4214.
      c. Paint cracking, peeling or checking.
   2. Warranty Period: 20 years.

C. Installer Warranty:
   1. Flashings and Trims: Warrant against installation failure.
      a. Failure includes damage by wind under stated design wind speed or temperature movement.
      b. Warranty Period: Two years.

PART 2 PRODUCTS

2.1 PERFORMANCE CRITERIA

A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, are to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim are not to rattle, leak, or loosen, and are to remain watertight.

B. Self-Adhering Flexible Flashing Performance: Self-adhering flexible flashing shall meet minimum performance requirements when tested according to AAMA 711.

C. Design Wind Load Criteria: See Structural Drawings.

D. Environmental Performance:
   1. Expansion and Contraction: Withstand thermal cycling over 120 degrees F ambient and 180 degrees F on material surfaces.

2.2 MATERIALS

A. Galvanized Steel Sheet: ASTM A653; structural steel sheet, G90 zinc coating.
   1. Finish: Two coat fluoropolymer.
   2. Color: Architect selected.

2.3 ACCESSORIES

A. Fasteners for Metals Other Than Aluminum: Same material and finish as item being fastened, with soft neoprene washers where exposed.

B. Solder: ASTM B32; type suitable for application and material being soldered.

C. Synthetic Underlayment: Manufactured roof underlayment sheets meeting ICC-ES AC188 acceptance criteria. Supply recommended fasteners.
   1. Manufacturers and products:
      a. GCP Applied Technologies TRI-FLEX XT.
      b. Owens Corning Duck Defense High Performance Roof Underlayment.
      c. Tamko Building Products Synthetic Guard Plus.

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D. Waterproof Underlayment: Self adhesive sheets manufactured to withstand high temperature below metal components; minimum 30 mils thick. Supply recommended primer.
   1. Manufacturers and Products:
      a. Carlisle Coatings & Waterproofing Inc CCW WIP 300HT.
      b. GCP Applied Technologies Ice and Water Shield HT.
      c. Henry Company Blueskin PE200 HT.
      d. Owens Corning WeatherLock Specialty Tile & Metal.
      e. Polyguard Products, Inc. Deck-Guard HT Roofing & Watershield Underlayment.

E. Slip Sheet: Rosin-sized building paper.

F. Concealed Sealant: Butyl, ASTM C1311.
   1. Manufacturers and Products:
      a. Pecora Corporation BA-98.
      b. Tremco Butyl Sealant.

G. Exposed Sealant: See Section 079200.

H. Separation Coating: Bituminous paint; SSPC-Paint 12.

I. Plastic Cement: ASTM D4586, Type I.

J. Surface-Applied Reglets: Extruded aluminum with bottom edge drip and top edge sealant recess. Supply with stainless steel screws with neoprene washers and anchorage devices appropriate to substrate.

2.4 FABRICATION

A. General:
   1. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
   2. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 ft. on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.
   3. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

B. Fabrication Reference Standards:
   1. SMACNA Architectural Sheet Metal Manual.
   2. NRCA Roofing Manual.

C. Form section shapes shown on Drawings, accurate in size, square, and free from distortion or defects.

D. Fabricate cleats of same material as sheet metal, interlocking with sheet.

E. Hem exposed edges on underside 1/2 inch; miter and seam corners.

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F. Moving Joints: Sealed lapped, bayonet-type or interlocking hooked seams.

G. Non Moving Joints: Sealed watertight.

H. Where lapped expansion provisions cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with butyl sealant concealed within joints.

I. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

J. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

K. Do not use graphite pencils to mark metal surfaces.

L. Fabricate corners, changes in plane, and terminations in shop with minimum 18 inch legs.

M. Counterflashing:
   1. Material:
      a. Galvanized Steel; 0.022 inch base metal thickness.
      b. Stainless Steel: 0.019 inch thickness.
   2. Fabricate to extend minimum 4 inches over protected construction, with hemmed bottom drip edge.
   3. Shop fabricate interior and exterior corners.

N. Parapet Scuppers: Two-piece fabrications, with mounting flanges. Lap pieces 4 inches minimum in direction of water flow.
   1. Material:
      a. Galvanized Steel; SMACNA recommended base metal thickness.

O. Roof Edge Fascia Trim: Fabricate per NRCA details for tested designs.
   1. Material:
      a. Galvanized Steel; 0.022 inch base metal thickness.
   2. Length: 8 to 12 feet long units.
   3. Joints: Butt joints with 6 inch concealed backing plate.

P. Copings: Fabricate per NRCA details for tested designs.
   1. Material:
      a. Galvanized Steel; 0.022 inch base metal thickness.
   2. Length: 8 to 12 feet long units.
   3. Joints: Butt joints with 12 inch concealed backing plate.

Q. Roof Drain Flashing:
   1. Material:
      a. Stainless Steel: 0.016 inch minimum thickness.

2.5 METALLIC-COATED STEEL FINISHES

A. Liquid Fluoropolymer Steel Sheet Coil Coatings: Two coat system, 70 percent PVDF resin by weight, minimum.
   1. Pencil Hardness, ASTM D3363, HB - H.
   2. Salt Spray Resistance, ASTM G85, 1,000 hours.
   3. Humidity Resistance, ASTM D2247, 1,000 hours.
   4. Dry Film Thickness: ASTM D1400, Paint system manufacturer recommended.

B. Silicone Polyester Coatings: Manufacturer standard process, epoxy primer and silicone polyester topcoat.

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PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that roof openings, penetrations, and curbs through roof are solidly set, reglets in place, and nailing strips located.

B. Verify that roofing base flashings are in place, sealed, and secure.

3.2 PREPARATION

A. Paint concealed uncoated metal surfaces with 15 mil minimum thickness separation coating.

3.3 INSTALLATION

A. Installation Reference Standards:
   1. SMACNA Architectural Sheet Metal Manual.
   2. NRCA Roofing Manual.

B. Install flashing with concealed fasteners.

C. Secure fabrications with concealed fasteners where possible.

D. Apply plastic cement between metal and bituminous materials.

E. Separate dissimilar metals with separation coating or non absorptive gaskets.

F. Underlayment:
   1. Synthetic: Install and adhered according to manufacturers instructions.
   2. Self-Adhered: Prime surfaces and install according to manufacturers instructions.

G. Slip Sheet: Apply on top of underlayment prior to installing sheet metal flashing work.

H. Counterflashing: Install counterflashing in contact with base flashing.
   1. Anchor counterflashing in reglets with wedges and apply sealant to joint per Section 079200.
   2. Drill counterflashing installed with surface mounted reglets so that anchorage fasteners go through the sheet metal. Apply sealant to back side of top edge and fasten reglet to wall construction. Apply sealant to top edge per Section 079200.
   3. Lap ends of counterflashing minimum 6 inches.

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I. Parapet Scuppers: Anchor securely in place and seal flanges watertight to wall face and to roof base flashing.

J. Edge Fascia Trim: Coordinate installation with roofing system to provide watertight protection for wall.
   1. Install trim in straight lines with accurately aligned profiles.
   2. Apply sealant to both edges of backing plates at joints.
   3. Install anchorage base and cleats with screws.
   4. Install fascia with continuous cleat.
   5. Install covers with full engagement of anchorage cleats and uniform joint width.

K. Copings: Coordinate installation with roofing system to provide watertight protection for wall.
   1. Install copings in straight lines with accurately aligned profiles.
   2. Apply sealant to both edges of backing plates at joints.
   3. Install anchorage base and cleats with screws.
   4. Install outer edge with continuous cleat.
   5. Install covers with full engagement of anchorage cleats and uniform joint width.

3.4 CLEANING

A. Remove soiling, stains, and hand prints.

B. Uncoated Galvanized Steel Sheet: Remove substances that would impair paint bond.

C. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.

END OF SECTION

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SECTION 07 84 00

FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Firestopping of penetrations in vertical and horizontal assemblies.

B. Principal Products:
1. Firestopping materials.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate joint construction and penetrations to accommodate firestopping.
2. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be accessed and installed in accordance with specified firestopping system design.
3. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

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B. Scheduling: Notify Owner testing agency seven days minimum before firestopping installation and provide access for inspection.

C. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Product characteristics, performance and limitation criteria.
2. Repair procedures.
3. Describe use of product in each tested design.

B. Schedule: List opening locations and sizes, penetrating items, and testing agency system design listings.

C. Engineering Judgments: For conditions not covered by listed designs, provide judgments on systems or assemblies to meet fire protection requirements by a licensed professional engineer, for presentation to authority having jurisdiction.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates:
1. Manufacturer: Certify products meet or exceed specified requirements and applicable code requirements.

B. Qualification Statements:
1. Applicator UL Qualified Firestop Contractor certification, FM Global Approval certification, FCIA Membership certification, or approval letter from manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For Firestopping.

B. Warranty Documentation: For Firestopping.

C. Fire-Resistance Inventory: Provide locations and details of firestop installations, with Listed Systems, engineering judgments, and equivalent fire-resistance rated assemblies, on record Life Safety Drawings and Operations and Maintenance manuals.

1.6 QUALITY ASSURANCE

A. Qualifications:
1. Specialty Firestop Contractor: Assign installation of through-penetration firestop systems and fire-resistive joint systems in Project to a single sole source firestop specialty contractor with one of the following qualifications.
a. Firm approved per FM Global 4991 or UL Qualified Firestop Program.
b. FCIA Contractor Member in good standing.
c. Manufacturer approval.
2. Licensed Professionals: Registered in state in which Project is located.

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B. Certifications: From Installer that firestopping is installed properly.

C. Field Samples: Construct example of each different firestop system. Demonstrate qualities of materials and execution, and acceptance criteria.
1. Obtain AHJ acceptance of field samples before start of Work.
2. Approved Samples establish work results standard.

1.7 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
1. Ambient and Substrate Temperature: Within limits permitted by manufacturer.
2. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Ventilation: Ventilate building spaces during and after application, providing complete air exchanges to manufacturer instructions. Use natural means; if inadequate, use forced-air circulation until firestopping dries thoroughly.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Firestopping Product Manufacturers:
   1. 3M Fire Protection Products.
   2. Hilti, Inc.
   3. HOLDRITE.
   4. RectorSeal.
   5. Specified Technologies, Inc.

2.2 PENETRATION AND JOINT FIRESTOPPING

A. General:
   1. Firestopping: Materials manufactured and installed to resist the spread of fire, smoke, and gasses, that maintain the fire resistance ratings of the horizontal and vertical assemblies into which they are installed.
   2. Firestopping Materials and Systems: Compatible with each other and substrates where installed.

B. Fire Rated Wall Penetrations: Firestopping rated per ASTM E814 or UL 1479, positive pressure differential tested at 0.01 inch wg.
   1. Wall Types: Fire walls, Fire barriers, Smoke partitions, and Fire partitions.
   2. F-Rating: Equal to or greater than assembly where installed.

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C. Fire Rated Horizontal Assembly Penetrations: Firestopping rated per ASTM E814 or UL 1479, positive pressure differential tested at 0.01 inch wg.
   1. Horizontal Assembly Types: Ceiling/roof assemblies.
   2. F-Rating: Equal to or greater than assembly where installed, 1 hour minimum.
   3. T-Rating: Equal to or greater than assembly where installed, 1 hour minimum except floor penetrations that occur within a wall cavity.

D. Fire Rated Joint Assemblies: Firestopping rated per ASTM E1966 or UL 2079.
   1. Fire Resistance Rating: Equal to or greater than assembly where installed.

E. Curtain Wall Floor Joint Assemblies: Firestopping rated per ASTM E2307.
   1. Fire Resistance Rating: Equal to or greater than assembly where installed.

F. Smoke Barriers: Firestopping rated per UL 1479.
   1. L-Rating: 0.30 inches wg, maximum; follow both of the following:
      a. 5.0 cfm per square foot of penetration opening, maximum.
      b. Cumulative leakage of 50 cfm per 100 sq. ft of floor or wall area, maximum.

G. Exposed Firestopping Materials: ASTM E84; Flame Spread 25, Smoke Developed 450, maximum.
   1. Color: Architect selected.

H. Accessory Materials: Firestopping manufacturer materials and components, approved by qualified testing and inspection agency, required for complete installation and fire rating of each firestopping assembly.
   1. Forming and Backing Materials:
      a. Rock wool and mineral wool insulation.
      b. Sealants.

c. Form boards.
d. Sealant backers or fillers.
e. Temporary forms.
2. Primers.
3. Collars.
4. Sleeves.

2.3 PERFORMANCE

A. Provide firestopping systems that are tested by a qualified testing agency acceptable to authorities having jurisdiction.

B. Mark firestopping systems with classification markings by one of the following, as acceptable to authorities having jurisdiction.
1. UL Fire Resistance Directory.
2. FM Global Building Materials Approval Guide.
3. Intertek Group Directory of Building Products.

2.4 MATERIALS AND COMPONENTS

A. Collars and Sleeves: Factory assembled collars and sleeves, consisting of a metal outer sleeve lined with intumescent material, and flanges and gaskets to mount the unit and seal the ends.

B. Sealants:
1. Latex: Single component, moisture resistant after curing.
2. Silicone: Single component, neutral curing, pourable for horizontal and nonsag for vertical or sloped applications.

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C. Intumescent Sheets: Composite sheets of galvanized steel and intumescent material designed for various opening sizes.

D. Wrap Strips: Foil faced, intumescent, elastomeric sheets.

E. Pillows: Compressible, intumescent cases.

F. Putties: Non-hardening, water-resistant, dielectric materials containing no inorganic fibers, silicones, or solvents.

G. Mortars: Prepackaged dry mixes of hydraulic cement, binders, and lightweight aggregates, mixed with water at installation site.

H. Silicone Foam: Multicomponent, site mixed elastomer that expands and cures in place as a stable, flexible foam.

2.5 MIXING

A. Mix materials to produce product characteristics required by manufacturer and testing agency.

2.6 SOURCE QUALITY CONTROL

A. Single Source Responsibility: Obtain firestop systems for each kind of penetration and construction condition from a single primary firestop systems manufacturer, to the greatest extent possible.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify pipes, conduit, cable, ductwork, and other items have been permanently installed.
   2. Verify field dimensions are as shown tested systems or Engineering Judgments.
   3. Verify system components are dry, clean, and ready for installation.

3.2 PREPARATION

A. Surface Preparation:
   1. Mask surfaces that will remain exposed after installation of firestopping.
   2. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.
      a. Remove foreign materials from substrate surfaces that could interfere with adhesion of penetration firestopping materials.
      b. lean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
      c. Remove laitance and form-release agents from concrete.

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3.3 INSTALLATION

A. Forming Materials: Install to retain and properly shape installed firestopping to achieve required fire rating.
   1. Remove combustible or temporary forming materials after curing firestopping.

B. Install firestopping materials to achieve required fire ratings.
   1. Apply materials to adhere to all contact surfaces.
   2. Fill all voids around openings.
   3. Finish firestopping that will be exposed after curing.

3.4 IDENTIFICATION

A. Permanently attach identification labels within 6 inches of edge of firestopping installations. Make labels visible toward the direction from which a person might approach to remove or alter the firestopping.

B. Provide labels that contain the following:
   1. Required Text: "Warning - Firestop System - Do Not Disturb. Notify Building Management of Any Damage."
   2. Installing Contractor Company name, contact information.

3. Firestopping testing agency design designation.
4. Installation date.
5. Manufacturer name.
6. Installer name.

3.5 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.
   2. Do not begin construction until inspectors have verified compliance of materials.
   3. Do not use materials that fail tests and inspections.

B. Tests and Inspections:
   1. Joint Firestopping: ASTM E2393.
   2. Penetration firestopping: ASTM E2174.

C. Repair or replace firestopping that is damaged or removed during inspection and testing.

D. Non-Conforming Work: Make corrections or replace, and retest.

E. Enclose firestopping after inspection reports confirm firestopping follows requirements.

3.6 CLEANING AND PROTECTION

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A. Remove excess firestopping materials. Do not damage adjacent materials.

B. Protect firestopping installations from damage or deterioration. Repair or replace firestopping that is damaged or removed before Substantial Completion.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Joint sealants.

B. Principal Products:
1. Exterior exposed nontraffic sealants.
2. Exterior concealed sealants.
3. Exterior preformed joint seals.
4. Interior sealants and caulking.
5. Installation Accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate work of this section with work requiring sealants.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting minimum one week before starting Work of this Section for exterior building sealants.
2. Additional Attendees:
a. Installers of exterior building sealants.
b. Glazing system installer.
c. Air barrier installer.
d. Roofing installer.

1.3 ACTION SUBMITTALS

A. Submittal Procedures:
1. Provide submittals for all sealants, exterior and interior, in a single group, regardless of how many subcontractors will install sealants. Multiple submittals for sealants are not acceptable.

B. Product Data:
1. Each sealant type.
2. Expanding tape seals.
3. Initial selection color Samples.

C. Joint Sealant Schedule:
1. Joint types.
2. Joint locations.
3. Sealant types and proprietary products.

a. Joint-Sealant manufacturer and product name.
4. Joint sealant colors.

D. Samples:
1. Cured sealant custom color ribbons; 12 inches minimum length.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates:
1. Provide written verification and list of products for Work under subsequent work packages that the same proprietary sealants will be used that were used for previous work packages.

B. Test and Evaluation Reports: Independent testing agency testing results.
1. Compatibility and adhesion test reports.
2. Staining potential test reports.

C. Field Quality Control Submittals: Field test and inspection reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data.

B. Warranty Documentation: Sealants.

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1.6 QUALITY ASSURANCE

A. Qualifications:
1. Installers: Authorized representative who is trained and approved by manufacturer.
2. Testing Agencies: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

B. Preconstruction Testing: Complete testing 30 days minimum before scheduled field installation or as recommended by manufacturer.
1. Adhesion: Field Test exterior wall sealants for adhesion to metal, masonry, and concrete per ASTM C794 and manufacturer published requirements to determine need for primer and substrate preparation.
2. Staining: Laboratory Test exterior wall sealants for staining of metal and masonry per ASTM C1248.

C. Field Samples: Construct each type of sealant joint, 4 feet long, minimum size. Demonstrate color and appearance.
1. Approved Samples establish work results standard.
2. Adhesion: Test exterior wall sealant joints per ASTM C1193, Method A in Appendix X1.1 or ASTM C1521, Method A. At joints between different materials, test each joint surface separately.

D. Mockups: Install sealants in exterior wall mockups. Demonstrate product interfaces, intersections, and terminations.
1. Adhesion: Test sealant joints in mockup per ASTM C1193, Method A in Appendix X1.1 or ASTM C1521, Method A. At joints between different materials, test each joint surface separately.
2. Approved mockups establish work results standard.

1.7 FIELD CONDITIONS

A. Ambient Conditions: Perform work within following limitations.
   1. Temperature: Perform work within sealant manufacturer published temperature limits.
   2. Precipitation: None occurring and none predicted within 24 hours.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Exterior Sealants: Warrant joint sealants will provide a watertight weather seal for the Warranty duration.
      a. Failure includes loss of elastomeric properties and required performance attributes.
      b. For porous substrates, failure also includes discoloration of substrates.
      c. Warranty Period, Urethanes: Five years.
      d. Warranty Period, Silicones: 20 years.

PART 2 PRODUCTS

2.1 SEALANTS - GENERAL

A. Source Control: Provide one proprietary product for each type of sealant required, regardless of what Subcontractor installs the sealant.
   1. Installers of joint sealants under subsequent work packages must use the same proprietary sealants used in the first work package that includes joint sealants.

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B. Select proprietary sealants for compatibility with other construction products that the sealants will contact.

C. Multiple colors may be required for exposed sealants to coordinate with substrate colors.

2.2 EXTERIOR EXPOSED NONTRAFFIC SEALANTS

A. Class 50 Silicone Sealant: Single component, nonsag, neutral curing; ASTM C920, Type S, Grade NS, Class 50, Use NT.
   1. Manufacturers and Products:
      a. Dow DOWSIL 795.
      b. GE Construction Sealants SCS2000 SilPruf.
      c. Pecora Corporation PCS.
      d. Sika Sikasil WS-295.
      e. Tremco Spectrem 2.
   2. Colors: Architect selected.

B. Class 50 Silicone Nonstaining Sealant: Single component, nonsag, neutral curing; ASTM C920, Type S, Grade NS, Class 50, Use NT; classed as nonstaining when tested per ASTM C1248.
   1. Manufacturers and Products:
      a. Dow DOWSIL 756 SMS.
      b. GE Construction Sealants SCS9000 SilPruf NB.
      c. Pecora Corporation 864NST.
      d. Tremco Spectrem 3.

2. Colors: Architect selected.

2.3 EXTERIOR PEDESTRIAN TRAFFIC SEALANTS

A. Pourable Silicone Sealant: ASTM C920, Type S, Grade P, Class 100/50, Uses T, M, A, O.
   1. Manufacturers and Products:
      a. Dow DOWSIL 890 SL.
      b. Pecora Corporation 300SL.
      c. Tremco Spectrem 900SL.
   2. Color: Architect selected.

2.4 EXTERIOR CONCEALED SEALANTS

A. Butyl Sealant: ASTM C1311.
   1. Manufacturers and Products:
      a. Pecora Corporation BC-158.
      b. Tremco Butyl Sealant.
      c. C.R. Laurence 888.

B. Silicone Air Barrier Sealant: Single component, nonsag, neutral curing; ASTM C920, Type S, Grade NS, Class 25, Use NT.
   1. Manufacturers and Products:
      a. Dow DOWSIL 758 Silicone Weather Barrier Sealant.
      b. Pecora Corporation AVB Silicone Sealant.
   2. Applications:
      a. Primary weatherproofing exterior joints between air and water resistive membranes and fenestration, doors, and louvers.

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C. Paintable Caulking: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
   1. Applications:
      a. Exterior assembly joints in painted siding and trim.

2.5 EXTERIOR PREFORMED JOINT SEALS

A. Silicone Extrusion Seals: Cured low-modulus silicone extrusion transition membrane and liquid-applied sealant for exterior wall openings.
   1. Manufacturers and Products:
      a. Dow DOWSIL Silicone Transition System with DOWSIL 758 silicone adhesive.
      b. Pecora Corporation Sil-Span with 864NST silicone adhesive.
      c. Sika Silbridge-300 with Sikasil WS-295.
      d. Tremco Proglaze ETA with Spectrem 1 Silicone Sealant.
   2. Joint Widths: See Drawings.
   3. Applications:
      a. Transitions between air and water resistive membrane and fenestration, doors, and louvers.
      b. Coping and parapet joints.

2.6 INTERIOR SEALANTS AND CAULKING

A. Sanitary Sealant: Mildew-resistant silicone; ASTM C920, Type S, Grade NS, Class 25 or greater, Use NT.
   1. Manufacturers and Products:
      a. Dow DOWSIL 786 SILICONE SEALANT.
      b. Pecora Corporation; 898 NST.
      c. Tremco Incorporated Tremsil 200 Sanitary.
   2. Colors: Architect selected.
   3. Applications:
      a. Joints around plumbing fixtures and fittings.
      b. Perimeters of lavatory counters.
      c. Control and expansion joints in food handling areas.

B. Paintable Caulking: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
   1. Manufacturers and Products:
      a. Pecora Corporation AC20.
      b. Sika MasterSeal NP 520.
      c. Tremco Tremflex 834.
   2. Applications:
      a. Interior joints noted as caulking.
      b. Joints, crevices, and irregularities wider than hairline joints in or between dissimilar materials and painted surfaces.
      c. Perimeters of door frames, frames and trim for glazing, and frames or trim for other wall and ceiling openings at painted surfaces.
      d. Ceiling joints between structural precast concrete floor planks.

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2.7 INSTALLATION ACCESSORIES

A. Primer: As required by sealant manufacturer.

B. Backer Rod: ASTM C1330, Type C, closed-cell or Type O, open-cell, manufacturer recommended types.

C. Bond Breaker Tape: Self-adhesive plastic tape to prevent sealant from adhering to back of joint.

D. Cleaners: Manufacturer recommended types.

E. Masking: Non-staining, self-adhesive, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

2.8 MIXES

A. Multicomponent Sealants: Mix components immediately before use.

B. Field-Tinted Products: Mix colorant with base to uniform consistency and custom color.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean joint surfaces for optimum adhesion. Remove dirt, moisture, and incompatible substances.

B. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.

C. Remove laitance and form release agents from concrete.

D. Existing Joints: Cut out and remove existing joint sealants down to original substrate. Small amounts of elastomeric sealants left in surface irregularities of concrete and masonry may be left in place subject to Architect approval, provided that they are securely bonded to surface, are compatible with new sealant, and are tested to demonstrate that suitable adhesion with new sealant can be achieved. Where these conditions cannot be met, remove existing sealants completely.

E. Prime joint surfaces where recommended by sealant manufacturer. Protect adjacent surfaces from misapplication or spillage of primer.

F. Mask surfaces adjacent to joints to receive elastomeric sealants. Remove masking after tooling.

3.2 INSTALLATION

A. Installation Reference Standard: Follow ASTM C1193.

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B. General Installation Requirements:
   1. Exterior Joint Sealants: Provide continuous, weatherproof seals to prevent infiltration of air and water through the joints.
   2. Interior Joint Sealants: Provide continuous seals to prevent air infiltration through the joints in which they are installed. Install sanitary sealant to prevent water infiltration.
   3. Appearance: Apply sealants with smooth surfaces free of gaps, voids, bubbles, lumps, crevices, runs, drips, striations, and other irregularities.

C. Set joint filler units at uniform depths in joints to support sealants and maintain proper sealant cross section shape and depth recommended by manufacturer for each application.

D. Set joint filler for sealant neck dimension 1/3 of joint width, maximum, or as recommended by manufacturer for application.

E. Install joint fillers under compression and friction fit. Do not install filler units that have absorbed water.
   1. Do not leave voids or gaps between ends of joint filler units.
   2. Do not stretch, twist, puncture, or tear joint fillers.
   3. Remove joint fillers that have absorbed moisture or which have ruptured gas cells and install suitable new fillers before sealant application.

F. Install bond breaker tape where shown on Drawings or where joint filler is not used to prevent adhesion to back of joint.

G. Deposit sealants in uniform, continuous ribbons without gaps or air pockets.

H. Tool sealants to ensure full adhesion. Form smooth, slightly concave surface.

I. Cure joint sealants.

J. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to work areas.
   1. Failed Test Retest Cost: Contractor responsibility.
   2. Do not use materials that fail tests and inspections.

B. Adhesion Testing: ASTM C1521, Method A.
   1. Perform one test.
   2. Report Content:
      a. Presence of voids and discontinuities.
      b. Sealant dimensions and seal shape.
      c. Failures in adhesion and cohesion.

C. Non Conforming Work: Remove sealants that do not pass tests, reapply sealant, and retest.

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3.4 CLEANING

A. Clean spills, misapplications, and material migrations immediately as they occur.

B. Clean marred surfaces by whatever means are necessary to eliminate evidence of spillage.

END OF SECTION

SECTION 080671 – DOOR HARDWARE SCHEDULE

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. AD - Adams Rite
5. SA - SARGENT
6. RF - Rixson
7. NO - Norton
8. SU - Securitron
9. OT - Other

Hardware Sets

Set: 1.0

Doors: 106b

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1	Continuous Hinge - Power Transfer Prep	CFM HDHPT		PE
1	Fail Secure Lock	64 10XG71 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1		Drop Plate as Req'd		NO
1	Threshold	171A or Per Sill Detail		PE
1	Sweep	315CN		PE
1	ElectroLynx Frame Harness	QC-C1500P		MK
1	ElectroLynx Door Harness	QC-C__P		MK
1	Position Switch	DPS		SU
1	Power Supply w/ Power Distribution Board	AQL Series-R8E1 as required		SU
1	Gasketing	By Door/Frame Manufacturer		OT

Notes: Card reader by Security.
Door typically closed and locked. Presenting valid credential will momentarily release lever allowing entry. In case of fire alarm or power loss door will remain locked (fail secure). Free egress at all times.

Set: 2.0

Doors: 100a, 118d

2	Continuous Hinge - Power Transfer Prep	CFM HD1 PT		PE
1	Concealed Vert Rod Exit	8600 MLR CA	628	AD
1	Core	DG1 6300	US15	SA
1	Mortise Cylinder	64 41	US32D	SA
2	Offset Door Pull	RM3311-12	US32D	RO
2	Surface Closer - Closer Stop	CPS7500	689	NO
2		Drop Plate as Req'd		NO
1	Threshold	171A or Per Sill Detail		PE
2	Sweep	315CN		PE
1	ElectroLynx Frame Harness	QC-C1500P		MK
1	ElectroLynx Door Harness	QC-C__P		MK
1	Position Switch	DPS		SU
1	Power Supply w/ Power Distribution Board	AQL Series-R8E1 as required		SU
1	Gasketing & Astragal	By Door/Frame Manufacturer		OT

Notes: Card reader by Security.
During scheduled hours doors are electrically dogged open for free entry and egress.
After hours doors are closed and locked. Presenting valid credential will momentarily retract latch bolts at active leaf to allow entry. Free egress at all times.

DRAFT

Set: 3.0

Doors: 122a

1	Continuous Hinge	CFM HD1		PE
1	Mortise Deadlock	MS1850S	628	AD
2	Core	DG1 6300	US15	SA
2	Mortise Cylinder	64 41	US32D	SA
2	Offset Door Pulls	RM3311-12 BTB Mtg	US32D	RO
1	Surface Closer - Closer Stop	CPS7500	689	NO
1		Drop Plate as Req'd		NO
1	Threshold	171A or Per Sill Detail		PE
1	Sweep	315CN		PE
1	Gasketing	By Door/Frame Manufacturer		OT

Set: 4.0

Doors: 118c

2	Continuous Hinge	CFM HD1		PE
1	Concealed Vert Rod Exit	8600 C CA	628	AD

1	Core	DG1 6300	US15	SA
1	Mortise Cylinder	64 41	US32D	SA
2	Offset Door Pull	RM3311-12	US32D	RO
2	Surface Closer - Closer Stop	CPS7500	689	NO
2		Drop Plate as Req'd		NO
1	Threshold	171A or Per Sill Detail		PE
2	Sweep	315CN		PE
1	Gasketing & Astragal	By Door/Frame Manufacturer		OT

Set: 5.0

Doors: 102c

2	Continuous Hinge	CFM HD1		PE
1	Concealed Vert Rod Exit	8600 CA	628	AD
2	Surface Closer - Closer Stop	CPS7500	689	NO
2		Drop Plate as Req'd		NO
1	Threshold	171A or Per Sill Detail		PE
2	Sweep	315CN		PE
1	Gasketing & Astragal	By Door/Frame Manufacturer		OT

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Set: 6.0

Doors: 101a

2	Hinge (heavy weight)	T4A3386 (NRP)	US32D	MK
1	Hinge (heavy weight)	T4A3386 QCW	US32D	MK
1	Fail Secure Exit Device	43 5CH 64 8874 ETL	US32D	SA
1	Core	DG1 6300	US15	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
1	Sweep	315CN		PE
1	Meeting Astragal Set	18041CSB		PE
1	ElectroLynx Frame Harness	QC-C1500P		MK
1	ElectroLynx Door Harness	QC-C__P		MK
1	Position Switch	DPS		SU
1	Power Supply w/ Power Distribution Board	AQL Series-R8E1 as required		SU

Notes: Card reader by Security.
Door typically closed and locked. Presenting valid credential will momentarily release lever allowing

entry. In case of fire alarm or power loss door will remain locked (fail secure). Free egress at all times.

Set: 7.0

Doors: 128a

6	Hinge (heavy weight)	T4A3386 (NRP)	US32D	MK
1	Concealed Vert Rod Exit	43 5CH 64 MD/WD8606 ETL	US32D	SA
1	Concealed Vert Rod Exit, Exit Only	43 5CH MD/WD8610 EO	US32D	SA
1	Core	DG1 6300	US15	SA
2	Surface Closer - Closer Stop	CPS7500	689	NO
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
2	Sweep	315CN		PE
1	Meeting Astragal Set	18041CSB		PE

Set: 8.0

Doors: 127a

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3	Hinge (heavy weight)	T4A3386 (NRP)	US32D	MK
1	Rim Exit Device, Storeroom	43 5CH 64 8804 ETL	US32D	SA
1	Core	DG1 6300	US15	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
1	Sweep	315CN		PE

Set: 9.0

Doors: 102b

3	Hinge (heavy weight)	T4A3386 (NRP)	US32D	MK
1	Rim Exit Device, Exit Only	43 5CH 8810 EO	US32D	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
1	Sweep	315CN		PE

Set: 10.0

Doors: 124a, 126a

5	Hinge, Full Mortise	TA2314 (NRP)	US32D	MK
1	Hinge, Full Mortise	TA2314 QCW	US32D	MK
1	Dust Proof Strike	570	US26D	RO
1	Self Latching Flush Bolt	2845/2945 as req'd	US32D	RO
1	Fail Secure Lock	64 10XG71 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Coordinator	2600 series x Brkts as req'd	Black	RO
2	Surface Closer - Closer Stop	CPS7500	689	NO
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
2	Sweep	315CN		PE
1	Overlapping Astragal	357SP		PE
1	ElectroLynx Frame Harness	QC-C1500P		MK
1	ElectroLynx Door Harness	QC-C__P		MK
1	Position Switch	DPS		SU
1	Power Supply w/ Power Distribution Board	AQL Series-R8E1 as required		SU

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Notes: Card reader by Security.
Door typically closed and locked. Presenting valid credential will momentarily release lever allowing entry. In case of fire alarm or power loss door will remain locked (fail secure). Free egress at all times.

Set: 11.0

Doors: 103b

2	Hinge, Full Mortise	TA2314 (NRP)	US32D	MK
1	Hinge, Full Mortise	TA2314 QCW	US32D	MK
1	Dust Proof Strike	570	US26D	RO
1	Self Latching Flush Bolt	2845/2945 as req'd	US32D	RO
1	Fail Secure Lock	64 10XG71 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Coordinator	2600 series x Brkts as req'd	Black	RO
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
1	Sweep	315CN		PE
1	Overlapping Astragal	357SP		PE

1	ElectroLynx Frame Harness	QC-C1500P	MK
1	ElectroLynx Door Harness	QC-C__P	MK
1	Position Switch	DPS	SU
1	Power Supply w/ Power Distribution Board	AQL Series-R8E1 as required	SU

Notes: Card reader by Security.
Door typically closed and locked. Presenting valid credential will momentarily release lever allowing entry. In case of fire alarm or power loss door will remain locked (fail secure). Free egress at all times.

Set: 12.0

Doors: 105a

3	Hinge, Full Mortise	TA2314 (NRP)	US32D	MK
1	Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
1	Sweep	315CN		PE

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Notes:

Set: 13.0

Doors: 115b, 116b

3	Hinge, Full Mortise	TA2314 (NRP)	US32D	MK
1	Classroom Lock	64 10XG37 LL	US26D	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Mop Plate	K1050 6" high CSK BEV	US32D	RO
1	Threshold	171A or Per Sill Detail		PE
1	Gasketing	303AS		PE
1	Sweep	315CN		PE

Set: 14.0

Doors: 106a

2	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Hinge, Full Mortise	TA2714 QCW	US26D	MK

1	Fail Secure Lock	64 10XG71 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Surface Closer - Tri-pack	7500 mounting as req'd	689	NO
1		Drop Plate as Req'd		NO
1	Wall Stop	403	US26D	RO
1	Gasketing	By Door/Frame Manufacturer		OT

Notes: Card reader by Security.
Door typically closed and locked. Presenting valid credential will momentarily release lever allowing entry. In case of fire alarm or power loss door will remain locked (fail secure). Free egress at all times.

Set: 15.0

Doors: 122b

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	64 10XG37 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Conc Overhead Stop (hvy duty)	1-X36	630	RF
1	Surface Closer - Tri-pack	7500 mounting as req'd	689	NO
1		Drop Plate as Req'd		NO
1	Gasketing	By Door/Frame Manufacturer		OT

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Set: 16.0

Doors: 102a

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
2	Concealed Vert Rod Exit	8600 C T CA	628	AD
3	Core	DG1 6300	US15	SA
3	Mortise Cylinder	64 41	US32D	SA
2	Offset Door Pull	RM3311-12	US32D	RO
2	Surface Closer - Closer Stop	CPS7500	689	NO
1	Gasketing & Astragal	By Door/Frame Manufacturer		OT

Set: 17.0

Doors: 118a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Rim Exit Device	8800 C CA	628	AD
1	Core	DG1 6300	US15	SA
1	Rim Cylinder	64 34	US32D	SA

1	Offset Door Pull	RM3311-12	US32D	RO
1	Surface Closer - Tri-pack	7500 mounting as req'd	689	NO
1		Drop Plate as Req'd		NO
1	Wall Stop	403	US26D	RO
1	Gasketing	By Door/Frame Manufacturer		OT

Set: 18.0

Doors: 113a

2	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Hinge, Full Mortise	TA2714 QCW	US26D	MK
1	Fail Secure Lock	64 10XG71 LL	US26D	SA
1	Core	DG1 6300	US15	SA
1	Conc Overhead Stop (hvy duty)	1-X36	630	RF
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
3	Silencer	608-RKW		RO
1	ElectroLynx Frame Harness	QC-C1500P		MK
1	ElectroLynx Door Harness	QC-C__P		MK
1	Power Supply w/ Power Distribution Board	AQL Series R8E1 as required		SU

DRAFT

Notes: Card reader by Security.
Door typically closed and locked. Presenting valid credential will momentarily release lever allowing entry. In case of fire alarm or power loss door will remain locked (fail secure). Free egress at all times.

Set: 19.0

Doors: 118b, 122c

6	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Self Latching Flush Bolt (Top Bolt Only)	2805/2905	US26D	RO
1	Storeroom/Closet Lock	64 10XG04 LL	US26D	SA
1	Core	DG1 6300	US15	SA
2	Surf Overhead Stop (Med Duty)	55-X36	652	RF
2	Kick Plate	K1050 10" high CSK BEV	US32D	RO
2	Silencer	608-RKW		RO

Set: 20.0

Doors: 108a, 109a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D MK
1	Storeroom/Closet Lock	64 10XG04 LL	US26D SA
1	Core	DG1 6300	US15 SA
1	Surf Overhead Stop (Med Duty)	55-X36	652 RF
3	Silencer	608-RKW	RO

Set: 21.0

Doors: 119a, 120a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D MK
1	Storeroom/Closet Lock	64 10XG04 LL	US26D SA
1	Core	DG1 6300	US15 SA
1	Wall Stop	403	US26D RO
3	Silencer	608-RKW	RO

Set: 22.0

Doors: 103c, 105b, 121a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D MK
1	Storeroom/Closet Lock	64 10XG04 LL	US26D SA
1	Core	DG1 6300	US15 SA
1	Surface Closer - Tri-pack	7500 mounting as req'd	689 NO
1	Kick Plate	K1050 10" high CSK BEV	US32D RO
1	Wall Stop	403	US26D RO
3	Silencer	608-RKW	RO

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Set: 23.0

Doors: 106c, 107a, 113b

3	Hinge, Full Mortise	TA2714 (NRP)	US26D MK
1	Entry/Office Lock	64 10XG05 LL	US26D SA
1	Core	DG1 6300	US15 SA
1	Wall Stop	403	US26D RO
3	Silencer	608-RKW	RO

Set: 24.0

Doors: 110a, 111a, 112a, 114a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D MK
1	Entry/Office Lock	64 10XG05 LL	US26D SA
1	Core	DG1 6300	US15 SA

1	Conc Overhead Stop (hvy duty)	1-X36	630	RF
3	Silencer	608-RKW		RO

Set: 25.0

Doors: 129a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	64 10XG37 LL	US26D	SA
1	Surface Closer - Tri-pack	7500 mounting as req'd	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 26.0

Doors: 103a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Classroom Lock	64 10XG37 LL	US26D	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
3	Silencer	608-RKW		RO

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Set: 27.0

Doors: 104a, 117a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Privacy Lock	V21 8266 LE1L	US26D	SA
1	Surface Closer - Tri-pack	7500 mounting as req'd	689	NO
1	Mop Plate	K1050 6" high CSK BEV	US32D	RO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
1	Smoke Gasketing	S88BL		PE

Set: 28.0

Doors: 111b

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Passage Latch	10XU15 LL	US26D	SA
1	Wall Stop	403	US26D	RO
3	Silencer	608-RKW		RO

Set: 29.0

Doors: 129b

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Passage Latch	10XU15 LL	US26D	SA
1	Surface Closer - Closer Stop	CPS7500	689	NO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
3	Silencer	608-RKW		RO

Set: 30.0

Doors: 115a, 116a

3	Hinge, Full Mortise	TA2714 (NRP)	US26D	MK
1	Push Pull Plate	110x73C/73CL	US32D	RO
1	Surface Closer - Tri-pack	7500 mounting as req'd	689	NO
1	Mop Plate	K1050 6" high CSK BEV	US32D	RO
1	Kick Plate	K1050 10" high CSK BEV	US32D	RO
1	Wall Stop	403	US26D	RO
1	Smoke Gasketing	S88BL		PE

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Set: 31.0

Doors: 125a, 129c

1	Hardware by Door/Frame Manufacturer		OT

END OF SECTION 080671

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Hollow metal work.

B. Principal Products:
1. Exterior doors and frames.
2. Interior doors and frames.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordinate Work of this Section with gypsum board partitions, glass and glazing, finish painting, and electrical power and control wiring.

B. Preinstallation Meetings:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Attendees: partition, wiring, and security system installers.
3. Agenda Items: electrified hardware wiring requirements.

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1.3 ACTION SUBMITTALS

A. Product Data.
1. Hollow metal doors and frames.

B. Shop Drawings: Show construction, sizes, configurations, reinforcements, anchorages, installation details.
1. Details of each different wall opening condition.
2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
3. Door elevations showing cutouts.
4. Door frame elevations and details for each frame type, including dimensioned profiles and metal thicknesses.
5. Hardware mounting locations.

C. Door Schedule: Use same designations as Drawings.
1. Show door and frame types, sizes, ratings, glazing, and hardware sets.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Manufacturers: SDI Certified.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store and handle door frames maintaining spreader bars in place until installation.

1.6 FIELD CONDITIONS

A. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. Ceco Door.
2. Curries.
3. Deansteel.
4. DCI Hollow Metal.
5. Hollow Metal Xpress.
6. Mesker Door.
7. Metal Products Incorporated.
8. Pioneer Industries.
9. Premier Steel Frames and Doors.
10. Republic Doors and Frames.
11. Security Metal Products.
12. Steelcraft.
13. Or approved equal.

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B. Substitutions: Permitted.

2.2 EXTERIOR DOORS AND FRAMES - EXTRA HEAVY DUTY

A. Doors: ANSI/SDI A250.8; 1-3/4 inch thick.
1. Classification: Level 3, Physical Performance Level A.
2. Model: 1, Full Flush.
3. Faces: Steel sheet, 0.053 inch thick, G90 coating.
4. Core: Insulated.
5. Top and Bottom Edges: Closure channel, top edge sealed watertight.

B. Frames: ANSI/SDI A250.8.
1. Material: Steel sheet, 0.053 inch thick, coating matching door face.
2. Construction: Face welded, mitered corners.
3. Thermal Break: Manufacturer standard.

2.3 INTERIOR DOORS AND FRAMES - HEAVY DUTY

A. Doors: ANSI/SDI A250.8; 1-3/4 inch thick.
   1. Classification: Level 2, Physical Performance Level B.
   2. Model: 1, Full Flush.
   3. Faces: Steel sheet, 0.042 inch thick, A60 coating.
   4. Non-Fire Rated Door Core: Kraft paper honeycomb.

B. Frames: ANSI/SDI A250.8.
   1. Material: Steel sheet, 0.053 inch thick, coating matching door face.
   2. Construction: Face welded, mitered corners.

2.4 LOUVERS

A. Interior Door Louvers: SDI 111.
   1. Type: Sight proof.
   2. Blade Profile: Inverted V.
   3. Blade Material: Steel sheet, 0.024 inch thick, coating matching door face.
   4. Frame Material: Steel sheet, 0.036 inch thick, coating matching door face.

2.5 PERFORMANCE

A. Fire Resistance:
   1. Test: NFPA 252 or UL 10C.
   2. Labeling: NFPA 80.
   3. Glazing Size Limits: NFPA 80.

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2.6 MATERIALS

A. Steel Sheet: ASTM A653/A653M; hot-dip galvanized coating.

B. Insulation:
   1. Door Core: Manufacturer standard.
   2. Door Frame: ASTM C665, Type 1, unfaced mineral fiber.

C. Glass and Glazing: See Section 088000.

D. Fasteners: Manufacturer standard.
   1. Steel Coating: ASTM A153/A153M hot-dip galvanized.

2.7 FABRICATION

A. Fabricate doors and frames with hardware reinforcement welded in place.
   1. Reinforce doors and frames for surface applied hardware without through bolting.
   2. Hardware Locations: ANSI A250.8.

B. Door Edges: Beveled.

C. Frames within Masonry Openings:
   1. Protect frame hardware preparations with mortar guard boxes.
   2. Head: 4 inches aligning with coursing.

D. Attach astragal to inactive leaf of paired fire rated doors.

E. Reinforce frames wider than 48 inches with flush roll formed steel channels fitted tightly into frame head.

F. Prepare interior frames for silencers, except where sound seals are specified.
   1. Single Door Strike Jambs: 3 silencers.
   2. Paired Door Heads: 2 silencers.

G. Frame Mullions for Double Doors:
   1. Fixed: Profile matching jambs.
   2. Removable: See Section 087100.

H. Fabrication Tolerances: SDI-117.

2.8 FINISHES

A. Primer Materials: ANSI/SDI A250.10, rust inhibiting.

B. Field Painting:
   1. See Section 099000.

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2.9 ACCESSORIES

A. Paired Door Astragals: Steel, T-shaped.

B. Galvanizing Repair Materials: ASTM A780/A780M.

C. Weatherstripping: See Section 087100.

D. Silencers: See Section 087100.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Verify opening sizes are within tolerance limits.

3.2 INSTALLATION

A. Install doors and frames. Follow ANSI/SDI A250.8.

B. Interface with Other Work:
   1. Coordinate door frame and anchor installation with jamb construction.
   2. Coordinate door and frame installation with door hardware installation. See Section 087100. Install silencers before installing frame.
   3. Coordinate removable stop installation with glass installation. See Section 088000.

C. Install steel reinforcement channels between two abutting frames. Anchor channels to overhead structure and floor.

D. Installation Tolerances: SDI-117.

E. Repair damaged zinc coatings. Follow ASTM A780/A780M.

F. Seal door frames to adjacent construction. See Section 079200.

G. Field paint doors and frames. See Section 099000.

3.3 REINSTALLATION

A. Reinstalled Products: See Section 024119.

B. Reinstall existing doors and frames at new location.

3.4 FIELD QUALITY CONTROL

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A. Inspections:
   1. Egress Doors: Inspect per NFPA 101.

B. Reporting: Prepare code-required reports and submit to Owner.

C. Non-Conforming Work: Make corrections or replace, and retest.

3.5 ADJUSTING

A. Adjust door for smooth and balanced door movement.

END OF SECTION

SECTION 08 31 00

ACCESS DOORS AND PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Access doors.

B. Principal Products:

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate sizes and locations with controls, valves, traps, dampers, cleanouts, and similar items requiring operation that are located behind finished surfaces.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data: Sizes, types, finishes, hardware, scheduled locations, fire resistance listings, and details of adjoining Work.

B. Shop Drawings:
1. Locations and sizes of access doors.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations and sizes of access doors and panels.

B. Maintenance data.

1.5 QUALITY ASSURANCE

A. Qualifications:
1. Fire Rated Door Inspector: NFPA 80, section 5.2.3.1.

B. Field Samples: Install access doors in locations acceptable to Architect.
1. Approved Samples establish Work results standard.

PART 2 PRODUCTS

2.1 WALL AND CEILING ACCESS DOORS AND PANELS

A. Gypsum Board Access Doors: Flush door with frame flanges concealed by gypsum board joint finishing compound.
   1. Manufacturers and Products:
      a. Milcor DW as basis of design.
      b. Babcock-Davis BNW.
      c. Bauco Access Panel Solutions Inc. BAUCO plus II.
      d. Karp Associates KDW.
      e. Nystrom NW.
      f. Williams Brothers Corporation of America WB DW 400 Series.
      g. Or approved equal.
   2. Substitutions: Permitted.
   3. Material: Steel sheet; ASTM A879.
      a. Door: 0.062 inch thick, nominal.
      b. Frame: 0.062 inch thick, nominal.
      c. Finish: Factory powder coat.
   4. Hinges: Concealed spring button type that allows door removal.
   5. Latches: Screw driver operation.
   6. Accessories:
      a. Gasketing.
      b. Masonry anchors.

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2.2 MATERIALS

A. Steel Sheet: ASTM A1008, cold rolled.

2.3 FABRICATION

A. Welded Units: Fabricate units of continuous welded construction; weld, fill, and grind exposed joints flush and smooth.

B. Size Variations: Obtain acceptance of manufacturers standard size units which vary slightly from sizes shown or scheduled.

C. Provide manufacturers recommended anchorage fasteners for Project applications.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify rough openings for access doors and panels are correctly sized and located.

3.2 INSTALLATION

A. Secure frames rigidly in place, plumb and level in opening, with plane of door and panel face parallel to adjacent finished surface.
   1. Set concealed frame type units flush with adjacent finished surfaces.

B. Position units to provide convenient access to concealed Work requiring access.

3.3 FIELD QUALITY CONTROL

A. Adjust doors and hardware, after installation, for proper operation.

B. Non Conforming Work: Remove and replace, and retest.

END OF SECTION

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OVERHEAD COILING DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Overhead coiling doors.

B. Principal Products:
1. Exterior overhead coiling doors.
2. Interior overhead coiling counter doors.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate installation of Work for support and anchorage of overhead coiling doors.
2. Coordinate power and control wiring for electrically operated doors.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Installers of power and control wiring.

1.3 INFORMATIONAL SUBMITTALS

A. Delegated Design Submittals:

1.4 ACTION SUBMITTALS

A. Product Data:
1. Each type of overhead coiling door, including tracks and hardware.
2. Motor operators, controls, and obstruction detection devices.
3. Automatic release devices for fire shutters.
4. Initial selection color charts and Samples.

B. Shop Drawings.
1. Each overhead coiling door type.
2. Support and anchorage details.

C. Door Schedule: Use same designations as Drawings.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

B. Warranty documentation.

1.6 QUALITY ASSURANCE

A. Qualifications:
1. Installers: Factory trained and authorized.
2. Licensed Professionals: Licensed in the state of California.

1.7 WARRANTY

A. Manufacturer Warranty: Warrant doors against defects in material and workmanship.
1. Overhead Coiling Doors: Warrant against product failure.
a. Failure Includes: Defects in materials and workmanship.
b. Warranty Period: Five years.

PART 2 PRODUCTS

2.1 EXTERIOR OVERHEAD COILING DOORS

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A. Exterior Overhead Coiling Doors: ANSI/DASMA 203.
1. Manufacturers and Products:
a. CornellCookson Model ESD 10 as basis of design.
b. C.H.I. Overhead Doors.
c. Clopay Building Products.
d. McKeon.
e. Overhead Door Corp.
f. Raynor.
2. Operation Cycles: 20 cycles per day; 50,000 cumulative with tamperproof counter.
3. Air Infiltration: 0.4 cfm/sf, maximum at 25 mph wind speed, tested per ASTM E283.
4. Door Curtains:
a. Slats: Flat, Manufacturer standard width.
b. Material: Galvanized steel.
c. Insulation: Minimum R- Manufacturer standard.
d. Interior Facing: Same material and finish as exterior.
e. Perimeter Weather Seals: Replaceable resilient gaskets.
f. Galvanized Steel Finish: Factory applied Spectra Shield powder coating.
1) Color: Architect selected.
5. Operation: Electric.
6. Pass Doors: Hollow metal door and hinged frame with same fire rating as overhead door and with egress hardware.
a. See Shop Drawings for door and frame size requirements.

2.2 COILING COUNTER DOORS

A. Overhead Coiling Counter Doors: ANSI/DASMA 203.
   1. Manufacturers and Products:
      a. CornellCookson ESC10.
      b. Clopay Building Product.
      c. McKeon CS3000 Series.
      d. Overhead Door Corp.
      e. Raynor Duracoil.
   2. Operation Cycles: 20 cycles per day; 50,000 cumulative with tamperproof counter.
   3. Operation: Manual.
   4. Door Curtains:
      a. Slats: Flat.
      b. Material: Galvanized steel 0.030 base metal thickness.
      c. Steel Finish: Factory applied SpectraShield polyester powder coating.
         1) Color: Architect selected.
   5. Locking: Manufacturer standard endlocks.
   6. Bottom Bar: Extruded aluminum with with manufacturer standard vinyl astragal.

2.3 COMMON COMPONENTS

A. Hoods:
   1. Material, Finish: Same as curtain.
   2. Shape: See Drawings.

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B. Bottom Bars:
   1. Material, Finish: Aluminum.
   2. Type: Standard duty.
   3. Supply sloped bottom bar at doorways with cross slope pavement.

C. Jamb Guides:
   1. Material, Finish: Galvanized steel.
   2. Endlocks for Exterior Doors: As recommended for door size and operation.

D. Counterbalances: Adjustable enclosed helical torsion spring with grease sealed ball bearings or self lubricating graphite bearings for rotating members.

E. Locking: Padlockable side bolt.

F. Manual Operators: Chain; 25 pound effort, maximum.

G. Motor Operators:
   1. Gear reduced type, mounted on head shaft.
   2. Sufficient power to operate door.
   3. Manually operable in case of power failure.
   4. Electrical Characteristics: See Drawings.
   5. Disconnect Switch: Factory mounted on equipment.

H. Controls:
   1. Control Station: Surface mounted momentary contact keyed switch station marked OPEN, CLOSE, and STOP.
      a. Keys: Supply four keys per station.

2. Automatic Re-Opening: Electric sensing strip on bottom bar and photoelectric sensors that immediately stop downward travel and reverse direction to fully opened position when obstruction is detected.

2.4 PERFORMANCE

A. Delegated Design:
1. Delegate overhead door design to manufacturer licensed Professional Engineer.
2. Wind Loads: See Drawings.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that Work for structural support and anchorage is adequate.

B. Verify that rough openings sizes, squareness, and floor levelness and flatness are within manufacturer recommended tolerances.

3.2 INSTALLATION

A. Install doors plumb and parallel to supporting walls.

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B. Anchor door tracks and operators rigidly and securely to prevent movement during door operation.

C. Install doors to operate smoothly without binding or distortion.

D. Install perimeter gaskets to provide continuous seals and for uniform compression.

E. Electrically Operated Doors:
1. Make wiring connections between power supply and operator and between operator and controls.
2. Adjust limit switches and obstruction detection controls for accurate movement.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
1. Failed Test Retest Cost: Contractor responsibility.

B. Testing:
1. Test obstruction detection controls.

C. Non-Conforming Work: Make corrections or replace, and retest.

3.4 CLEANING

A. Clean factory primed surfaces of soiling and substances that affect subsequent finish painting.

3.5 CLOSEOUT ACTIVITIES

A. Demonstration: Coordinate demonstration by factory authorized representative with Owner staff.
   1. Demonstrate operation of electrically operated doors.

END OF SECTION

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ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Aluminum framed storefront and entrances.

B. Principal Products:
1. Aluminum-framed storefronts.
2. Glazing.
3. Glazed aluminum doors.
4. Hardware.

1.2 REFERENCES

A. Reference Standards:
1. AAMA/WDMA/CSA 101/I.S.2/A440, North American Fenestration Standard.

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one month, minimum, before starting Work of this Section.
2. Additional Agenda Items:
a. Coordination with curtain wall installation.
b. Hardware not supplied under this Section.

1.4 ACTION SUBMITTALS

A. Special Requirements: Transmit required submittals concurrently with submittals for the curtain wall system.

B. Product Data:
1. Storefront framing, included tested performances.
2. Glazed aluminum entrance doors.
3. Entrance door hardware specified in this Section.
4. Initial selection color Samples.

C. Shop Drawings:
1. Plans and elevations for each installation.
2. Anchorage and support details.
3. Details for continuity of air and water barrier with adjacent construction.

4. Flashing and internal drainage details.
5. Thermal expansion and deflection provision details.
6. Trim details.
7. Extruded sill details.
8. Sizes and locations of loads transmitted to building structural supports.

D. Schedules: Door hardware coordinated with hardware specified in Section 087100.

E. Samples:
1. Typical Framing Member: 12 inches long in required finish.
2. Door: 12 by 12 inch bottom door corner showing construction, reinforcement, glazing, and weatherstripping.

1.5 INFORMATIONAL SUBMITTALS

A. Delegated Design Submittals: Design calculations.
1. Aluminum-framed storefronts.

B. Field Quality Control Submittals: Field test and inspection reports.

C. Manufacturer Reports: Field inspection reports.

D. Qualification Statements: Testing agency.

E. Impact resistance data.

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F. Energy Performance Certifications: NFRC-certified energy performance values from manufacturer.

G. Sample Warranties: For aluminum-framed entrance and storefront systems.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For framing system, doors, hardware, and finishes.

B. Warranty Documentation: For framing system, doors, hardware, and finishes.

1.7 QUALITY ASSURANCE

A. Qualifications:
1. Installer: NACC certified contractor, AGMT certified glazing technicians, certified under National Glass Association Certified Glass Installer Program, or Manufacturer trained or approved.
2. Licensed Professionals: Registered in state in which Project is located.

B. Preconstruction Testing:
1. Provide labels on storefront framing required to be tested for impact resistance rating per requirements of authorities having jurisdiction.
2. Labels: Permanent metal labels, readily visible but inconspicuous from general view.
3. Label Information:
a. Manufacturer identification.

b. Model number.
c. Serial number or definitive information describing product performance characteristics.
d. Approved agency identification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements: Follow AAMA CW-10.
1. Protect aluminum components from bending and from impact, abrasion, and other harmful contacts.
2. Maintain factory applied finish protections intact until removal is recommended by manufacturer.

1.9 FIELD CONDITIONS

A. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

1.10 WARRANTY

A. Manufacturer Warranty: Repair or replace components that do not follow requirements or that fail in materials or workmanship.
1. Failures under design conditions specified in performance requirements.
a. Breakage or loss of glass.
b. Permanent deformation of components or assemblies.
c. Water penetration through fixed glazing.
d. Failure of hardware specified in this Section.
2. Warranty Period: Ten years.

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B. Finish Warranty: Repair deteriorated finishes or replace components.
1. Deterioration includes the following:
a. Color Fading: More than 5 Hunter units per ASTM D2244.
b. Chalking: More than No. 8 rating per ASTM D4214.
c. Paint cracking, peeling or checking.
2. Warranty Period: Ten years.

PART 2 PRODUCTS

2.1 ALUMINUM-FRAMED STOREFRONTS

A. Exterior Storefront: Thermally broken extruded aluminum framing system, reinforced to support loads.
1. Manufacturers and Products:
a. Arcadia Incorporated AG601T Series.
b. EFCO Corporation.
c. Kawneer.
d. Oldcastle BuildingEnvelope.
e. U.S. Aluminum.
f. YKK AP.
2. Construction: Thermally broken.

3. Glass Installation: 4-side captured, installed from exterior.
4. Glazing Plane: Center.
5. Profile Dimensions: See Drawings.
6. Finish: Color anodized.
    a. Color: See Drawings.

B. Interior Storefront: Nonthermal extruded aluminum framing system, reinforced to support loads.
1. Manufacturers and Products:
    a. Arcadia Incorporated AR450 Series.
    b. EFCO Corporation.
    c. Kawneer.
    d. Oldcastle BuildingEnvelope.
    e. U.S. Aluminum.
    f. YKK AP.
2. Glazing Plane: Center.
3. Profile Dimensions: See Drawings.
4. Finish: Color anodized.
    a. Color: See Drawings.

C. Sills: Extruded aluminum, finished same as framing.

D. Stools: Extruded aluminum finished same as framing.
1. Include integral gypsum board receiver channel.

E. Formed Trim: Aluminum sheet, 0.060 inch minimum thickness, finished same as framing.

F. Exposed Flashing: Aluminum sheet, 0.040 inch minimum thickness, finished same as framing.

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2.2 GLAZING

A. Glass: Section 088000.

B. Glazing Gaskets:
1. Material: Silicone and EPDM or other synthetic rubber; PVC not permitted.
2. Color: Black.

2.3 GLAZED ALUMINUM DOORS

A. Doors: Manufactured by storefront manufacturer, sized to coordinate with storefront framing. Provide internal reinforcement needed for hardware.
1. Thickness: 1-3/4 inch.
2. Stiles: See Drawings.
3. Bottom Rail: ADA-compliant.
4. Exterior Doors: Thermally broken, prepared for 1-inch insulating glass.
5. Interior Doors: Prepared for 1/4 inch glass.
6. Glazing Beads: Rectangular profile.
7. Manufacturer Name Plates: Acceptable on door edges only.
8. Finish: Color anodized.
    a. Color: See Drawings.

2.4 HARDWARE

A. Hardware: See Section 087100 for items not specified in this Section.

B. Continuous Gear Hinges: Manufacturer standard with stainless steel bearings between knuckles; fabricated to full height of door and frame.
   1. Manufacturers:
      a. Hager Companies.
      b. McKinney Products Company.
      c. Select Products Limited.
   2. Finish: Match door.

C. Manual Flush Bolts: BHMA A156.16, Grade 1.

D. Thresholds: Extruded aluminum, ADA-compliant profile; BHMA A156.21.
   1. Configuration:
      a. Width: 6 inches.
      b. Thermal Break: Centered under door.
      c. Bumper Seal: Replaceable rubber or silicone seal strip in stop strip.

E. Push and Pull Handles: Architect selected.
   1. Pull Handle Length: See Drawings.

F. Closers: ADA compliant adjustable units for door size and anticipated use frequency; integral cushion stop that limits door swing to 110 degrees.
   1. Manufacturers:
      a. Corbin Russwin Architectural Hardware.
      b. LCN.
      c. Norton Door Controls.
      d. Rixson Specialty Door Controls.
   2. Surface Mounted Closers: Aluminum case finished to match framing and doors; BHMA A156.4, Grade 1.
   3. Concealed Overhead Closers: BHMA A156.8, Grade 1.

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G. Weatherstripping: Manufacturer standard replaceable head and jamb type that meets performance requirements.

H. Interior Door Silencers: Manufacturer standard replaceable resilient type.

2.5 PERFORMANCE

A. Delegated Design:
   1. Delegate exterior storefront system design to manufacturer licensed Professional Engineer.
   2. Structural Design Criteria: See Structural Drawings.
   3. Structural Loads: See Drawings and Applicable code compliant.
      a. Include loads from window cleaning and maintenance equipment.
   4. Deflection: At design wind speed.
      a. Perpendicular to Wall: 1/180 of span, not to exceed 3/4 inch edge of glass deflection.
      b. Parallel to Glass Plane: 1/360 of span, not to exceed 1/8 inch.
   5. Seismic Movement: Design to criteria stated on Structural Drawings.
   6. Wind Movement: Design to criteria stated on Structural Drawings.

7. Structural Movement: Design to criteria stated on Structural Drawings.

B. Environmental Performance:
1. Air Infiltration: ASTM E283.
a. Fixed Framing and Glass: 0.06 cfm/sq. ft., maximum at 1.57 lbf/sq.ft. static air pressure differential.
b. Single Doors: 0.50 cfm/sq. ft., maximum at 1.57 lbf/sq.ft. static air pressure differential.
2. Water Penetration: ASTM E331.
a. Fixed Framing and Glass: No water at 10.0 lbf/sq.ft. static air pressure differential.
3. Thermal Transmission: NFRC 100; U-Factor, maximum.
4. Condensation Resistance: NFRC 500; 45, minimum, per AAMA 1503.1-88.
5. Solar Heat Gain Coefficient: NFRC 200; 0.40, maximum.
6. Expansion and Contraction: Withstand thermal cycling over 120 degrees F ambient temperature and 180 degrees F on material surfaces.

C. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.6 MATERIALS

A. Aluminum: Manufacturer recommended alloy and temper.
1. Extruded Profiles: ASTM B221.
2. Sheet and Plate: ASTM B209.
3. Structural Items: ASTM B308.

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B. Steel Reinforcement: Galvanized.
1. Structural Shapes: ASTM A36.
2. Cold-Rolled Shapes: ASTM A1008.
3. Hot-Rolled Shapes: ASTM A1011.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Assembly Sealants: Silicone.
1. VOC Content: 250 g/L, maximum.

E. Fasteners: Stainless steel.
1. Where exposed or semi-exposed, use countersunk flathead screws finished to match adjacent surface.

F. Separation Coating: Bituminous paint; SSPC-Paint 12.

G. Concrete Anchors: Manufacturer recommend expansion or screw anchors.

2.7 FABRICATION

A. Fabricate components for uniform 1/2 inch shim space at jambs and heads.

B. Fabricate joints flush, hairline, and weathertight.

C. Provide internal reinforcements needed for performance requirements.

D. Maintain thermal break of exterior assemblies.

E. Conceal fasteners and attachments from view.

F. Provide flat closure plates for open channel perimeter frame members.

G. Fabricate sheet metal components per SMACNA Architectural Sheet Metal Manual.
   1. Fabricate trim and flashing in lengths to minimize number of joints.
   2. Fabricate trim to uniform sizes and profiles with smooth, flat surfaces free of oil-canning or other distortion.
   3. Fabricate trim for concealed anchorage where possible.

H. Prepare components in shop for door hardware installation.
   1. Factory install entrance door hardware to the greatest extent possible.
   2. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

I. Weep Holes: Round or oblong, 5/16 inch minimum diameter; manufacturer recommended spacing.

J. Provide continuity of drainage for condensation and infiltrated water to system weeps.

K. Glazing Option: Framing and doors may be factory glazed before delivery to Project site.

L. Fabrication Tolerances:
   1. Square: 1/8 inch maximum difference in diagonal measurements.
   2. Corner, Face Offsets: 1/16 inch maximum.
   3. Bow in Framing Members: 1/16 inch maximum.
   4. Joints: Hairline at permanent connections, 1/16 inch maximum at removable glazing stops.

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M. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

2.8 FINISHES

A. Anodizing: AAMA 611 Class I or AAMA 612 with electrodeposition organic seal.
   1. Color: Dark bronze.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that adjoining air and water barriers are in place and extend into rough openings beyond location of exterior joint seals.

3.2 PREPARATION

A. Separation Coating: Apply bituminous paint to surfaces that will contact concrete, dissimilar metals, masonry, and preservative-treated wood, or provide other permanent isolation material.

3.3 INSTALLATION

A. Do not install damaged or substandard components, including items that have deficient finishes.
   1. Corrections in field are subject to Architect approval before installation.
   2. Return components to factory for remanufacturing or refinishing, or provide new components to replace items that cannot be satisfactorily corrected in field.

B. Install steel reinforcement channels between two abutting frames. Anchor channels to overhead structure and floor.

C. Coordinate attachment and sealing of exterior assemblies to air and water barrier materials to ensure continuity.

D. Install assemblies plumb, level, square, and accurately aligned.

E. Anchor assemblies securely to structural elements.

F. Set sill members with two lines of continuous sealant per Section 079200.

G. Install flashing with end dams. Lap joints minimum 6 inches and seal watertight. Secure flashing with non-penetrating anchorages.

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H. Fill shim spaces with mineral fiber insulation.

I. Remove debris, dirt, aluminum scraps, and other materials from glazing channels.

J. Doors: Install for smooth operation and weathertight fit.
   1. Hardware: Mount with concealed fasteners.
   2. Set thresholds in continuous bed of sealant or gasketing and fasten rigidly in place so they do not rock or cause noise when walked on.

K. Verify that internal drainage and weeps are fully functional.

L. Glass Installation: Section 088000.

M. Tolerances:
   1. Variance from Plumb, Plane, and Level: 1/8 inch in 10 feet and 1/4 inch in 40 feet, maximum.
   2. Variance in Alignment Between Adjacent Units: 1/16 inch, maximum.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage agency to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.
   2. Verify that sealants have cured fully before testing.

3. Perform tests before interior wall finishes installation.

B. Water Spray Test: AAMA 501.2.
1. Initial Test Location: Architect designated area of storefront.
2. Additional Locations: Test two additional Architect designated areas during remaining installation period.
3. Pass Criteria: No water penetration.

C. Air Infiltration Testing: AAMA 503.
1. Locations: Water resistance test locations.
2. Test Pressure: Specified in Performance article.
3. Allowable Leakage: 1.0 times rate specified in Performance article per ASTM E283.

D. Non-Conforming Work: Make corrections or replace, and retest.

3.5 ADJUSTING

A. Adjust doors and door hardware for smooth operation and secure weathertight closure.

B. Adjust door closers per ADA requirements.

3.6 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

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B. Clean exposed surfaces. Remove excess sealants, and glazing materials.

3.7 PROTECTION

A. Protect storefronts from contaminating substances and glass damage.

END OF SECTION

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ALUMINUM WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Aluminum windows.

B. Principal Products:
1. Aluminum windows.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate window installation with construction of rough openings and air barrier application.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one month, minimum, before starting Work of this Section.
2. Additional Agenda Items:
a. Preparatory work performed under other sections.
b. Provisions for anchoring, flashing, weeping, and sealing windows.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Windows.
2. Hardware.
3. Glass.
4. Initial selection color Samples.

B. Shop Drawings.
1. Plans, elevations, and sections for each window type, showing the following:
a. Anchorage and support details.
b. Air barrier continuity details.
c. Thermal expansion provisions.
d. Flashing and drainage details.
e. Trim details.
f. Extruded sill and stool details.
g. Glass material identification, including strength and coating.

C. Window Schedule: Use same designations shown on Drawings.

D. Samples:
1. Typical frame member 12 inches long in required finish.

2. Color sample, manufacturer standard size.
3. Hardware: Full sized Samples. Approved Samples may not be incorporated into Work.

1.4 INFORMATIONAL SUBMITTALS

A. Certificates: Data for thermal performance.

B. Qualification Statements: Installer and manufacturer.

C. Test and Evaluation Reports: Independent testing agency test results showing compliance with requirements.

D. Field Quality Control Submittals: Field test and inspection reports.

E. Impact resistance data.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For aluminum windows.

B. Warranty Documentation: For aluminum windows.

1.6 QUALITY ASSURANCE

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A. Qualifications:
1. Installer: Window manufacturer certified.
2. Manufacturer Qualifications: A manufacturer capable of fabricating aluminum windows that meet or exceed performance requirements indicated and of documenting this performance by test reports and calculations.

B. Field Samples: Install one window.
1. Field Sample Testing: See Field Quality Control article.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect factory finished aluminum surfaces with wrapping or strippable coating.

1.8 WARRANTY

A. Manufacturer Warranty:
1. Aluminum windows: Warrant against product failures.
   a. Defective material or workmanship, excessive deflection, water leakage, condensation, and air infiltration.
   b. Operation and hardware failure.
   c. Insulating glass seal failure, including misting or dusting between panes.
2. Warranty Period:
   a. Window: Ten years.
   b. Insulating Glass: Ten years.

B. Finish Warranty: Repair deteriorated finishes or replace components.
   1. Deterioration includes the following:
      a. Color Fading: More than 5 Hunter units per ASTM D2244.
      b. Chalking: More than No. 8 rating per ASTM D4214.
      c. Paint cracking, peeling or checking.
   2. Warranty Period: Ten years.

PART 2 PRODUCTS

2.1 ALUMINUM WINDOWS

A. Aluminum Windows: AAMA/WDMA/CSA 101/I.S.2/A440.
   1. Manufacturers and Products:
      a. Cover Glass USA; top and bottom captured, stacking glass window units, as basis of design.
   2. Framing: Nonthermal.
      a. Frame Depth: 1 inch wide by 2-1/2 inches high.
   3. Track: 1-3/4 inches wide by 2-1/4 inches high.
   4. Operation: Sliding, stacking.
      a. Single sliding.
   5. Finishes: Architect selected.
   6. Glass: See Section 088000 for reference.
      a. Glass products as recommended by window manufacturer.
      b. Fully tempered, laminated glass panels, as recommended by manufacturer.
      c. Glass Coatings, Tints, and Features: As selected by Architect.
   7. Hardware: Manufacturer standard.
   8. Sliding Window Hardware:
      a. Tracks: Manufacturers standard extruded aluminum.
      b. Locks: Manufacturer standard.
      c. Finish: Architect selected.

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B. Weatherstripping: Manufacturer standard type, full operating sash perimeter.

C. Accessories: Hardware, fastenings, clips, fins, anchors, glazing beads and other appurtenances necessary for complete installation.

2.2 PERFORMANCE

A. Structural Loads: Applicable code and ASCE 7 compliant.

B. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.3 MATERIALS

A. Aluminum Extrusions: ASTM B221.

B. Aluminum Sheet: ASTM B209.

C. Assembly Sealants: Silicone.
   1. VOC Content: 250 g/L maximum.

D. Separation Coating: Bituminous paint; SSPC-Paint 12.

E. Concrete Anchors: Group 1 stainless steel expansion anchors.

F. Internal Reinforcement: Hot-dip galvanized steel structural shapes or cold formed sheet fabrications.

2.4 FABRICATION

A. Fabricate window components for uniform shim space recommended by manufacturer at jambs.

B. Fabricate joints flush, hairline, and weathertight.

C. Provide internal reinforcements needed for loading requirements and anchorage to substrate.

D. Conceal fasteners and attachments from view.

E. Fabricate sheet metal components per SMACNA Architectural Sheet Metal Manual.
   1. Fabrication Length: Minimize trim and flashing joints.
   2. Fabricate trim to uniform sizes and profiles with smooth, flat surfaces free of oil canning or other distortion.
   3. Fabricate trim for concealed anchorage where possible.

F. Prepare components for hardware installation.

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G. Weatherstrip operable units.

H. Provide continuity of drainage for condensation and infiltrated water to system weeps.

I. Separation Coating: Apply bituminous paint to surfaces that will contact concrete, dissimilar metals, and masonry, or provide other permanent isolation material.

J. Glazing: As recommended by manufacturer and selected by Architect.

K. Fabrication Tolerances:
   1. Square: 1/8 inch maximum variation in diagonal measurements.
   2. Corner, Face Offsets: 1/32 inch maximum.
   3. Bow in Framing Members: 1/16 inch maximum.
   4. Joints: Hairline at permanent connections, 1/32 inch maximum at removable glazing stops.

2.5 FINISHES

A. Powder Coating: One coat fluoropolymer finish; AAMA 2604.
   1. Manufacturers and Products:
      a. IFS Coatings IFS 400SD.
   2. Color: Architect selected.

B. Color Coating: Two coat fluoropolymer finish with minimum 70 percent PVDF resin by weight in color coat; AAMA 2605.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify wall openings are ready to receive windows.
   1. Verify adjoining air barriers are in place and extend into rough openings beyond exterior joint seals.

3.2 INSTALLATION

A. Install in compliance with with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E2112.

B. Attach window frame and shims to perimeter opening to accommodate construction tolerances and other irregularities.

C. Install windows plumb and level, free of warp or twist.

D. Maintain dimensional tolerances and alignment with adjacent Work.

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E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Coordinate attachment and seal of perimeter air barrier and vapor retarder materials.

G. Fill shim spaces with insulation.

H. Install perimeter sealant per Section 079200.

I. Install operating hardware.

3.3 INSTALLATION TOLERANCES

A. Maximum Variation from Level or Plumb: 1/16 inches every 3 feet noncumulative or 1/8 inches per 10 feet, whichever is less.

3.4 ADJUSTING

A. Adjust operating sashes and hardware for smooth operation and secure weathertight closure.

3.5 CLEANING

A. Remove protective material from factory finished aluminum surfaces.

B. Wash metal and glass surfaces after installation and shortly before Substantial Completion inspection.

C. Remove excess sealant.

END OF SECTION

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SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
   1. Exterior and interior glazing.

B. Principal Products:
   1. Base glass.
   2. Heat treated glass.
   3. Insulating glass.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
   1. Coordinate Work of this Section with substrates and adjoining finishes.

B. Preinstallation Meeting Attendees and Procedures:
   1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data:
   1. Each type of glass.

B. Samples: 12 by 12 inch Samples of each glass type except clear monolithic.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturers of fabricated glass units.

B. Qualification Data: For Installer and manufacturers of fabricated glass units.

C. Test and Evaluation Reports: Independent testing agency test results showing:
   1. Heat soak test survival.

D. Impact resistance data.

1.5 CLOSEOUT SUBMITTALS

A. Warranty Documentation: For insulating glass.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: NACC certified Contractor, AGMT certified glazing technicians, or certified under National Glass Association Certified Glass Installer Program.

B. Mockups: Provide glass for fenestration in exterior wall mockups.

1.7 FIELD CONDITIONS

A. Ambient Conditions:
   1. Temperature: Minimum 40 degrees F and rising.
   2. Install glass only when glazing frames are free of moisture, including condensation, frost, and ice.

1.8 WARRANTY

A. Manufacturer Warranty:
   1. Heat Soaked Tempered Glass: Warrant against nickel sulfide breakage above 0.3 percent of installed units.
      a. Warranty Period: Ten years.
   2. Insulating Glass: Warrant against the following:
      a. Edge seal failure.
      b. Internal condensation that does not dissipate.
      c. Spacer delamination.
      d. Warranty Period: Ten years.

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PART 2 PRODUCTS

2.1 BASE GLASS

A. Clear Glass: ASTM C1036, Type I, Class 1, Quality-Q3.

B. Low Iron Ultra-Clear Glass: ASTM C1036, Type I, Class 1, Quality q3; minimum 90 percent visible light transmission.
   1. Manufacturers and Products:
      a. Guardian UltraClear.
      b. Pilkington Optiwhite.
      c. Viracon Low Iron.
      d. Vitro Starphire.

2.2 HEAT TREATED GLASS

A. Heat Treated Glass: ASTM C1048, Type 1, Quality Q3; free of mosaic or pattern distortion visible from fixed viewpoint and other defects caused by roller pick.
   1. Heat-Strengthened Glass: Kind HS.
   2. Tempered Glass: Kind FT.

B. Roll Ripple Surface Wave Tolerances:
   1. Heat-Strengthened Glass: 0.002 inch, maximum.
   2. Tempered Glass: 0.005 inch, maximum.

C. Roll Ripple Orientation: Horizontal.

D. Fabricate heat treated units with permanent label in consistent location at either lower corner.

E. Heat Soak Test: Test tempered glass for nickel sulfide inclusions per DIN EN 14179-1.

2.3 INSULATING GLASS

A. Insulating Glass Units: Factory assembled double pane units tested per ASTM E2190 and certified by IGCC.

B. Spacer Strips: Aluminum, mill finish with desiccant fill.

C. Space Fill: Dehydrated air.

D. Edge Seals:
   1. Primary Seal: Black polyisobutylene.
   2. Secondary Seal: Silicone.
   3. Structural Silicone Glazing: Edge seals tested for compatibility with silicone glazing sealant used on Project.

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2.4 GLASS TYPES

A. Glass Types: Refer to Storefront Legend on Drawings.

2.5 INSTALLATION MATERIALS

A. Setting Blocks: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 80 to 90 Shore A durometer hardness.

B. Spacers: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 50 to 60 Shore A durometer hardness.

C. Glazing Gaskets: Specified with framing system.

D. Interior Glazing Tape: ASTM C1281 and AAMA 800; butyl based elastomeric tape with integral resilient tube spacer, 10 to 15 Shore A durometer hardness, coiled on release paper; widths required for installation.
   1. Color: Black.
   2. Supply preshimmed tape with continuous spacer for hollow metal glazing frames and other applications recommended by tape manufacturer.

E. Smoke Removal Targets: As required by local fire marshal.

2.6 PERFORMANCE

A. Impact:
1. Safety Glazing: 16 CFR 1201, Category II.

2.7 FABRICATION

A. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material.

B. Fabricate before delivering glass to site.

C. Provide code required permanent labels in locations that will be visible but inconspicuous after installation.

D. Exposed Glass Edges and Corners: Grind smooth and polish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions, with Installer present:
1. Framing is ready to receive glazing.
2. Weep systems are unblocked and functional.
3. Face and edge clearances are sufficient.
4. Framing joints are properly sealed.

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B. Examine glass lites for damage and defects before installation.

C. Do not install tempered glass with noticeable roller pick optical distortion.

3.2 PREPARATION

A. Clean glazing channels and rabbets; remove loose materials and moisture.

B. Remove protective coatings on metal surfaces.

C. Clean glass just before installation.

3.3 INSTALLATION - GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

D. Provide spacers for glass lites where length plus width is larger than 50 inches.

E. Install glass without direct contact on framing surfaces.

F. Maintain manufacturer recommended edge and face clearances between glass and frame members.

G. Set glass centered in openings on setting blocks.

H. Provide edge blocking needed to prevent sideways movement of glass in framing.

I. Set glass with correct orientation of exterior side.

3.4 INSTALLATION - GASKET GLAZING

A. Fabricate gaskets to fit openings.

B. Install gaskets in single pieces on each side of opening with joints only at corners.

C. Where recommended by framing system manufacturer, seal corners watertight.

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D. Compress gaskets to produce weathertight seal without causing bending stresses in glass.

3.5 INSTALLATION - TAPE GLAZING

A. Install tape on fixed stop form continuous airtight seals. Do not stretch tapes to make them fit.

B. Butt tape corners with full contact.

C. Install tape projecting slightly above sight line.

D. Insert spacer shims between glass and applied stops at 24 inch intervals, but not less than 2 per side, and 1/4 inch below sight line.

E. Install removable glazing stops in full contact with tape.

F. Trim protruding tape edges flush with stops.

3.6 CLEANING

A. Remove nonpermanent labels and clean surfaces after installation.

B. Clean glass on both sides shortly before inspection for Substantial Completion.

3.7 PROTECTION

A. Protect glass vulnerable to damage with streamers attached to framing.

B. Exterior Glass:
   1. Protect glass from contact with contaminating substances.
   2. Examine glass surfaces below concrete or masonry for alkaline deposits and dirt, and remove such soiling when observed.
   3. Provide new replacement units for damaged glass, including glass with stains or etching that cannot be removed.
   4. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

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SECTION 09 05 61

COMMON WORK RESULTS FOR FLOORING PREPARATION

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Remove existing floor coverings.
2. Test concrete floor slabs for moisture and alkalinity.
3. Prepare existing and new concrete slabs for the following flooring types:
a. Resilient tile and sheet.
b. Broadloom or tile carpet.
4. Remediate concrete floor slabs due to unsatisfactory moisture or alkalinity conditions.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate work results of this section with manufacturer recommendations for specified finish flooring types.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Floor Covering and Adhesive Manufacturer Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
a. Moisture and alkalinity limits and test methods.
b. Manufacturer required bond/compatibility test procedure.
2. Remedial Materials:
a. Test reports indicating compliance with specified performance requirements, performed by nationally recognized independent testing agency.

1.4 INFORMATIONAL SUBMITTALS

A. Visual Observation Report: For existing floor coverings to be removed.

B. Testing Agency Report:
1. Description of areas tested; include floor plans and photographs if helpful.
2. Summary of conditions encountered.
3. Moisture and alkalinity test reports.
4. Copies of specified test methods.

5. Recommendations for remediation of unsatisfactory surfaces.
6. Include certification of accuracy by authorized official of testing agency.
7. Submit report to Architect two Business Days, maximum after conclusion of testing.

C. Adhesive Bond and Compatibility Test Report.

D. Specimen Warranty: Issued by remedial material manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Warranty Documentation: For remedial floor coatings.

1.6 QUALITY ASSURANCE

A. Testing Agency: Employ and pay for an independent testing agency to perform moisture and alkalinity testing.
   1. Qualifications: Experienced in specified testing methods.
   2. Contractor Responsibility Relating to Independent Agency Testing:
      a. Provide access for and cooperate with testing agency.
      b. Confirm date of start of testing at least 10 days before actual start.
      c. Allow at least 4 Business Days on site for testing agency activities.
      d. Achieve and maintain specified ambient conditions.
      e. Notify Owner when specified ambient conditions have been achieved and when testing will start.

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B. Remedial Coating Installer Qualifications: Flooring preparation specialist company, trained or employed by coating manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in manufacturer packaging; include installation instructions.

B. Keep materials from freezing.

1.8 FIELD CONDITIONS

A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours before testing, at not less than 65 degrees F or more than 85 degrees F.

B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours before testing, at not less than 40 percent and not more than 60 percent.

PART 2 PRODUCTS

2.1 FLOORING PREPARATION MATERIALS

A. Patching and Self-Leveling Compound:
   1. Cementitious moisture, mildew, and alkali resistant compound, compatible with floor, floor covering, and floor covering adhesive, capable of being installed to thicknesses shown, and feathered to nothing at edges.
   2. Compressive Strength: 4000 psi, minimum after 28 days per ASTM C109/C109M or ASTM C472, whichever is appropriate.

B. Flooring Adhesive: Floor covering or adhesive manufacturer recommended product, suitable for the moisture and pH conditions present.
   1. VOC Content: 50 g/L, maximum and CalGreen compliant.

C. Remedial Floor Coating: Single or multilayer coating or coating/overlay combination.
   1. Manufacturers and Products: Testing agency recommended or one of the following:
      a. ARDEX Engineered Cements ARDEX MC RAPID with ARDEX V 1000.
      b. Custom Building Products CustomTech Tech MVC with TechLevel 100.
      c. Dependable Floor Products; Platform EMS with SKIMFLOW NP.
      d. KOSTER American Corporation KOSTER VAP I 2000 FS with KOSTER LevelStrong.
      e. LATICRETE International, Inc. Vapor Ban with NXT Level.
      f. MAPEI Planiseal VS with Novoplan 2 Plus.
      g. UZIN; UZIN PE 460 with UZIN NC 150.
   2. Primer: Manufacturer recommended for selected assembly.

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PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Follow ASTM F3010.

3.2 CONCRETE SLAB PREPARATION - LIGHTWEIGHT CONCRETE

A. Testing: Relative humidity and pH testing is not required.

B. Remediation: Apply remedial floor coating system over entire floor area.

3.3 CONCRETE SLAB PREPARATION - NORMAL WEIGHT CONCRETE

A. Follow recommendations of testing agency and ASTM F3010.

B. Perform following operations in this order:
   1. Existing on-grade and elevated concrete slabs with existing floor coverings:
      a. Observe existing floor covering for adhesion, water damage, alkaline deposits, and other defects.
      b. Remove existing floor covering.

2. Existing concrete slabs with coatings or penetrating sealers/hardeners/dustproofers:
   a. Do not attempt to remove coating or penetrating material.
   b. Do not abrade surface.
3. Perform preliminary cleaning.
4. Internal Relative Humidity Testing: Three tests in the first 1000 square feet and one test in each additional 1000 square feet, or flooring manufacturer recommended frequency.
5. Alkalinity Tests: Relative humidity test locations.
6. Specified remediation, if required due to relative humidity test result.
7. Patching, smoothing, and leveling.
8. Other preparation specified in finish flooring sections.
9. Adhesive bond and compatibility test.
10. Apply protection.

C. Remediations:
   1. Active Water Leaks or Continuing Moisture Migration to Surface of Slab: Correct before doing any other remediation; retest after correction.
   2. Excessive Relative Humidity: If an adhesive that is resistant to the level of moisture present is available and acceptable to flooring manufacturer, use that adhesive for installation of the flooring; if not, apply remedial floor coating over entire suspect floor area.
   3. Excessive Alkalinity:
      a. If remedial floor coating is necessary to address excessive moisture, no additional remediation is required for pH.
      b. If an adhesive that is resistant to the pH level present is available and acceptable to the flooring manufacturer, use that adhesive for installation of the flooring; otherwise, apply a skim coat of specified patching compound over entire suspect floor area.

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3.4 EXISTING FLOOR COVERINGS REMOVAL

A. Follow local, State, and federal regulations and RFCI Recommended Work Practices for Removal of Resilient Floor Coverings, applicable to floor covering being removed.

3.5 PRELIMINARY CLEANING

A. Clean floors, remove adhesion inhibiting substances.

B. Do not use solvents for cleaning.

3.6 INTERNAL RELATIVE HUMIDITY TESTING

A. Where the floor covering manufacturer requirements conflict with either the referenced test method or this Specification, follow the manufacturer requirements.

B. Testing: ASTM F2170 Procedure A. Calcium Chloride and electrical impedance or resistance testing may not be substituted.

C. If test values exceed floor covering manufacturer limits, perform remediation. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

D. Report the information required by the test method.

3.7 ALKALINITY TESTING

A. Where the floor covering manufacturer requirements conflict with either the referenced test method or this Specification, follow the manufacturer requirements.

B. Use a wide range alkalinity test paper, its associated chart, and distilled or deionized water.

C. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity test paper into the water, remove it, and compare immediately to chart to determine alkalinity reading.

D. In the event that test values exceed floor covering manufacturer limits, perform remediation. In the absence of manufacturer limits, perform remediation if alkalinity test value exceeds 10.

3.8 PREPARATION

A. See individual floor covering sections for additional requirements.

B. Follow testing agency recommendations.

C. Fill and smooth surface cracks, grooves, depressions, control joints and other nonmoving joints, and other irregularities with patching compound.

D. Do not fill expansion joints, isolation joints, or other moving joints.

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3.9 ADHESIVE BOND AND COMPATIBILITY TESTING

A. Follow requirements and recommendations of floor covering manufacturer.

3.10 APPLICATION OF REMEDIAL FLOOR COATING

A. Mix and apply remedial floor coating.
   1. Prohibit traffic during application.
   2. Honor substrate control, isolation and expansion joints.
   3. Prime substrate, and apply floor coating in layers as recommended by manufacturer.
   4. Allow coating to cure before applying finish flooring.

3.11 PROTECTION

A. Cover prepared floors with building paper or other durable covering until finish flooring is installed.

END OF SECTION

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Gypsum board assemblies.

B. Principal Products:
1. Gypsum board.
2. Gypsum shaftliner panels.
3. Tile backing panels.
4. Firestopping components.
5. Texture finishes.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate concealed framing for supports and anchorage of other work.

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B. Preinstallation Meeting:
1. Conduct meeting one month, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data.

B. Samples:
1. Trim Accessories: 12 inch lengths of trim other than edge beads and control joints.
2. Textured Finishes: Apply to gypsum board, 4 by 6 inches minimum.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: ASTM C840.

B. Protect cold-formed framing per AISI S202.

PART 2 PRODUCTS

2.1 GYPSUM BOARD

A. Fire Resistant Gypsum Board: ASTM C1396, paper faced.
   1. Core: 5/8 inch, Type X; locations shown on Drawings.

B. Contractor Option: Use lightweight or standard gypsum panels.

C. Ceiling Board: ASTM C1396.

D. Moisture and Mold Resistant Gypsum Board: ASTM C1396.
   1. Manufacturers and Products:
      a. CertainTeed M2Tech Mold Resistant.
      b. Georgia-Pacific Gypsum ToughRock Mold-Guard.
      c. National Gypsum Gold Bond XP.
      d. USG Corp Sheetrock MoldTough.
   2. Core: 5/8 inch Type X.
   3. Mold Resistance: 10 per ASTM D3273.

2.2 TILE BACKING PANELS

A. Glass-Mat, Water Resistant Gypsum Backing Board: ASTM C1178.
   1. Manufacturers and Products:
      a. CertainTeed Corp. GlasRoc Tile Backer.
      b. Georgia Pacific DensShield Tile Backer.
      c. National Gypsum Company eXP Fire-Shield Tile Backer.
      d. USG Durock Brand Glass-Mat Tile Backerboard.
   2. Core: 5/8 inch, Type X.
   3. Mold Resistance: 10 per ASTM D3273.

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B. Cementitious Backing Units: ANSI A118.9 and ASTM C1325 C1288.
   1. Manufacturers and Products:
      a. National Gypsum Company, Permabase Cement Board.
      b. USG Corporation; Durock Brand Cement Board with Edgeguard.
   2. Thickness: 5/8 inch.
   3. Mold Resistance: 10 per ASTM D3273.

2.3 BACKING

A. Contractor Option: Use manufactured, preformed sheet steel backing, manufactured flexible wood backing system, or flat strap backing plates.

B. Manufactured, Preformed Sheet Steel Backing: 6 inch wide, 68 mil steel, formed to fit stud spacing.
   1. Manufacturers and Products:
      a. Perfect Wall, Inc. Flush-Mount Flat Reinforced Backing.

C. Wood Backing System: Fire retardant treated wood and predrilled steel clips.
   1. Manufacturers and Products:
      a. ClarkDietrich Danback Fire-Retardant Treated Wood Backing Plate.

b. SCAFCO Kwik-Back.

D. Flat Strap Backing Plates: Steel sheet screwed to studs.
1. Width: 6 inches minimum or as needed for secure anchorage of wall mounted items.
2. Base Steel Thickness: 63 mils minimum where supporting the following items.
a. Handrails, grab bars, and other items that support live loads.
b. Fireplace mantles.
c. Curtains and drapery track.
d. Headboards.
e. Wall supported counter tops and cabinets.
f. Ladders.
g. Electrical panels.
h. Electrically operated fixtures, furnishings, or equipment.
i. Large lighting fixtures.
j. Wall mounted televisions and monitor screens.
k. Mirrors.
l. Large artwork.

2.4 PERFORMANCE

A. Structural Design Criteria:
1. Horizontal Partition Load: 5 psf.
2. Vertical Ceiling Load: Supported material dead load.
3. Partition Horizontal Deflection Limits:
a. Tile or Stone Finished Partitions: 1/360 of wall height.
b. Other Partitions: 1/240 of wall height.
4. Ceiling Vertical Deflection Limits: 1/360 of span.

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B. Fire Resistance: Assemblies tested per ASTM E119.
1. Fire Ratings: See Drawings.

C. Acoustic Performance:
1. STC: Tested per ASTM E90, classified per ASTM E413. See Drawings for STC ratings.

2.5 WOOD PARTITION FRAMING ACCESSORIES

A. See Section 061000 for metal anchors and accessories required for wood framing. See Structural Drawing for both structural and non-structural wood framing requirements.
1. Hangers, Post Bases, Tie Downs, Ties, and Hold Downs: See Structural Drawings.
2. Bridging: Rigid galvanized steel, V-section, nailless type, 0.050-inch-thick, length to suit joist size and spacing.
3. Wall Bracing: T-shaped galvanized steel bracing made for letting into studs in saw kerf, 1-1/8 inches wide by 9/16-inch-deep by 0.034-inch-thick with hemmed edges.
4. Wall Bracing: Angle galvanized steel bracing made for letting into studs in saw kerf, 15/16 by 15/16 by 0.040 inch-thick with hemmed edges.

2.6 INSTALLATION COMPONENTS

A. Framing Installation:
1. Anchors: Framing manufacturer recommended types for substrates.

2. Fasteners: See Section 061053.
3. Acoustic Gaskets: Closed cell foam self-adhesive strips allowing fastener penetration without foam displacement, 1/8 inch thick minimum, widths to match stud sizes.

B. Interior Trim: ASTM C1047.
1. Material: Galvanized or aluminum coated steel sheet.
2. Shapes: Cornerbead.

C. PVC Trim: ASTM C1047 and ASTM D3678.
1. Manufacturers:
a. ClarkDietrich.
b. Plastic Components, Inc.
c. Trim-Tex Inc.
2. Shapes: Cornerbead.

D. Sound Attenuation Blankets: ASTM C665, Type I, unfaced semi rigid mineral wool or fiberglass, thickness shown on Drawings, sized for friction fit.
1. Manufacturers and Products:
a. CertainTeed Corporation Fiber Glass Building Insulation.
b. Johns Manville Unfaced Fiber Glass Batts.
c. Knauf Insulation EcoBatt Insulation.
d. Owens Corning PINK Next Gen Fiberglas Insulation.
2. Fire Rated Partitions: Insulation type required by fire resistance designs referenced on Drawings.
3. Surface Burning Characteristics: ASTM E84.
a. Flame Spread: 25 maximum.
b. Smoke Developed: 50 maximum.
4. Thickness:
a. Walls: 3 1/2 inches.
b. Ceilings: 3 1/2 inches.

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E. Acoustic Sealant: ASTM C834; nonsag, paintable, nonstaining, butyl free, latex sealant.
1. Manufacturers and Products:
a. Accumetric LLC BOSS 824 Acoustical Sound Sealant.
b. GE Construction Sealants RCS20.
c. Grabber Construction Products Acoustical Sealant GSC.
d. Hilti, Inc. CS-S SA Light.
e. Pecora Corporation AC-20 FTR.
f. Specified Technologies, Inc. Smoke N Sound Acoustical Sealant.
g. USG Corporation SHEETROCK Acoustical Sealant.
2. Fire Rated Partitions: Acoustical sealant type required or permitted by fire resistance designs shown on Drawings.

F. Electrical Box Pads: Moldable non curing one component, intumescent, fire rated material for through penetration fire stop systems and sound attenuation systems; self adhering; 1/8 inch thick, minimum.
1. Manufacturers and Products:
a. Kinetics Noise Control Fire-Rated Isobacker.
b. Specified Technologies, Inc. SpecSeal Firestop Putty Pads.

G. Thermal Insulation: Section 072100.

H. Gypsum Board Fasteners:
1. Wood Framing: ASTM C1002, Type W.

I. Tile Backer Board Fasteners: Board manufacturer standard, corrosion resistant steel.

J. Laminating Adhesive: Recommended type for directly adhering gypsum panels to continuous substrate.

K. Joint Materials:
1. Interior Gypsum Board: ASTM C475/C475M; products compatible with substrate and other coatings applied to surface.
a. Skim Coat For Final Coat of Level 5 Finish: Spray applied high build coating.
2. Tile Backer Board: Product recommended by backer unit manufacturer.

2.7 TEXTURE FINISHES

A. Primer: Texture finish manufacturer standard product.

B. Texture Finish: Ready mixed product for spray, brush, roller, or trowel application.
1. Finish Texture: Architect selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify rough-in utilities are in proper locations.

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B. Examine panels for moisture and mold; discard damaged panels.

3.2 INSTALLATION - FRAMING TOLERANCES

A. Deviation from Indicated Position: 1/8 inch in 10 feet, maximum.

B. Deviation from Plumb and Level: 1/8 inch in 12 feet, maximum.

3.3 INSTALLATION - ELECTRICAL BOX SEALS

A. Install seals before installing gypsum board.

B. Overlap front edge of box so that seals will be compressed around edges of box as gypsum panels are installed.

C. Applications:
1. Electrical boxes in fire barriers, smoke barriers, and STC rated walls.
2. Electrical boxes at interior gypsum board faces of exterior walls.

3.4 INSTALLATION - INTERIOR GYPSUM BOARD

A. Follow ASTM C840.
   1. Fire Rated Partitions: Install per tested designs referenced on Drawings.
   2. Acoustically Rated Partitions: Install per tested designs referenced on Drawings.

B. Cementitious Backer Units: Follow ANSI A108.11.
   1. Locations: walls behind tile.

C. Cut panels to fit obstructions and openings without tearing face paper or cracking core.

D. Install panels with face side out with lightly butted joints.

E. Stagger joints on opposite sides of partitions.

F. Locate panel ends over support framing.

G. Fit panels to ducts, pipes, conduit, and other penetrations and obstructions with maximum 1/4 inch joints.

H. Attach gypsum board to framing and to supplementary framing and blocking provided for additional support at openings and cutouts.

I. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.

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J. Isolate perimeter of non-loadbearing drywall partitions from structural members. Provide 1/4 to 1/2 inch space and trim edge with edge bead. Seal joints with acoustical sealant.

K. Single Layer Installation:
   1. Install panels vertically with long edges on continuous supports.
   2. Attach panels to framing with screws.

L. Double Layer Installation:
   1. Attach base layer to framing with screws.
   2. Offset second layer joints and attach panels with screws.
   3. At walls taller than 9 feet, install panels horizontally and provide control joints at floor lines.

M. Wood Framing: Floating internal corner construction. Float panels over flat grain of wide dimensioned lumber, including floor joists and headers.

3.5 INSTALLATION - TRIM

A. Vertical Trim: Install in single pieces where length is 9 feet or less.

B. Control Joints: Install per ASTM C840 and as follows.

C. Corner Bead: Outside corners.

D. Casings: Install at termination joints with other construction or where edges are exposed.

E. Reveals: Install trim plumb, level, accurately aligned, and fitted neatly with hairline joints.
   1. Cut trim with sharp power saw and file cut edges to remove burrs.
   2. Miter joint at changes in direction or plane, except that inside corners may be coped.
   3. Apply masking tape or other protection to reveal surfaces before starting drywall finishing.
   4. Rated Fire and Smoke Barriers and Non-Rated Smoke Partitions: Install reveals to maintain rating.
   5. Routing of gypsum board to create reveals is not acceptable.

3.6 GYPSUM BOARD FINISHING

A. Gypsum Board Finishing: ASTM C840.

B. Finish panel joints, inside corners, trim flanges, fastener heads, and surface defects to provide smooth, continuous surfaces of monolithic appearance that are suitable for applied finishes.

C. Do not fill spaces around penetrations through fire resistive assemblies with joint compound. Leave space for firestopping.

D. Finish Levels:
   1. Level 1: Surfaces in plenums and other concealed areas.
   2. Level 2: Surfaces that receive tile.
   3. Level 3: Not used.
   4. Level 4: Surfaces that receive paint coatings.
   5. Level 5: Surfaces that receive wall coverings.

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3.7 IDENTIFICATION

A. Identify fire rated walls and partitions and other walls required to have protected openings or penetrations.
   1. Locations: Within 4 feet of corners and maximum 12 feet between on both sides.
      a. In spaces without ceilings, locate signs minimum 10 feet above finish floor and not blocked from view by ducts, structure, or other elements.
   2. Signs: Painted stencil signs with minimum 4 inch high letters and 1/2 inch strokes, or as required by authorities having jurisdiction, or approved self adhesive signs.
   3. Text: Use following or as required by authorities having jurisdiction.
      a. 1-HOUR FIRE BARRIER – FIRESTOP ALL PENETRATIONS.
      b. 2-HOUR FIRE BARRIER – FIRESTOP ALL PENETRATIONS.
      c. 3-HOUR FIRE WALL –.

3.8 ADJUSTING

A. Water-Exposed Products: Remove entire panels; do not cut and patch gypsum board.

3.9 CLEANING

A. Remove spills, spatters, and misapplications of finishing materials as they occur.

B. Repair other finish surfaces damaged during drywall operations.

3.10 PROTECTION

A. Protect adjacent surfaces from gypsum panel compounds, adhesives, and sealants.

B. Protect finished gypsum panels from being marred from ongoing Work.

END OF SECTION

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SECTION 09 30 00

TILING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Tiling.

B. Principal Products:
1. Porcelain tile.
2. Quarry tile.
3. Mortar.
4. Grout.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Floor Tile on Concrete: Conduct meeting before pouring concrete slabs.
3. Interior Wall Tile: Conduct meeting before installing wall studs.
4. Additional Attendees:
   a. Concrete installer.
   b. Gypsum wallboard installer.
5. Additional Agenda Items:
   a. Preparing and testing concrete slabs for tile installation.
   b. Locating substrate joints.
   c. Scheduling waterproof membrane cure times and testing.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Tile.
2. Tile trim and accessories.
3. Mortar.
4. Grout.
   a. Provide initial selection color Samples.
5. Membranes.
6. Metal trim.

B. Shop Drawings.
1. Locations of tile and tile patterns.
2. Locations of control and expansion joints.
3. Show field verified dimensions of disruptions in floor and wall surfaces; outlets, controls, vents, drains, switches, and other elements not covered by tile.

C. Samples:
   1. Tile: Full sized Samples of each type and color.
   2. Metal Trim: 12 inch long section of each profile and finish.
   3. Stone thresholds: 12 inch long section by full width.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Statements: Installer.

B. Manufacturer Reports: Field test reports.
   1. Tile-setting and grouting products.
   2. Slip-resistance test reports from qualified independent testing agency.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Tile and Trim Units: Full size units equal to 3 percent of each product, minimum.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Contractor Supervisor: International Masonry Institute Foreman Certification.
   2. Installers: Successful completion of the Ceramic Tile Education Foundation's (CTEF) Certified Tile Installer (CTI) program and the ACT (Advanced Certifications for Tile Installers) program.

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B. Field Samples: Construct floor tile installation and wall tile installation, 48 by 48 inches, minimum size; each tile type.
   1. Approved Samples establish work results standard.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.8 WARRANTY

A. System Warranty: Manufacturer's non-prorated comprehensive warranty that agrees to repair and replace defective installation areas, material, and labor that fail under normal usage within specified warranty period.
   1. Warranty Period: 10 years from date of Product Purchase.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

PART 2 PRODUCTS

2.1 TILE PRODUCTS

A. Porcelain Floor and Wall Tile:: ANSI A137.1.
1. Manufacturers and Products: See Finish Schedule on Drawings.
2. Tile Size: See Finish Schedule.
3. Color: See Finish Schedule.
4. Grout Color: Architect selected.

B. Quarry Floor Tile: ANSI A137.1.
1. Manufacturers and Products: See Finish Schedule on Drawings.
2. Tile Size: See Finish Schedule.
3. Color: See Finish Schedule.
4. Grout Color: Architect selected.

2.2 TRIM AND ACCESSORIES

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A. Trim Units: Coordinated with colors, sizes, and coursing of adjoining flat tile.

B. Shapes: See Finish Schedule on Drawings.

C. Stone Thresholds:
1. Profile: Beveled edges at 1:2 slope with lower edge of bevel aligned with adjacent floor finish.
a. Height: 1/2 inch maximum above adjacent floor finish.
2. Marble Thresholds: ASTM C503, with a minimum abrasion resistance of 10 per ASTM C1353 or ASTM C241 and with honed finish.
a. Color and Pattern: Architect selected.

2.3 METAL TRIM

A. Metal Strips: Finishing Edges.
1. Manufacturers:
a. Blanke Corporation.
b. Ceramic Tool Company.
c. MAPEI Profilpas.
d. Schluter Systems.
2. Shapes: Architect selected.
3. Height: Align exposed surfaces with tile and setting bed thickness.
4. Material: Stainless steel.
5. Finish: Architect selected.

2.4 MORTAR MATERIALS

A. Thickset Mortar Installation Materials: Latex-modified portland cement, ANSI A108.02.
   1. Cleavage Membrane: polyethylene sheets, ASTM D 4397, 4 mils thick.
   2. Reinforcing Wire Fabric: ANSI A108.1A.

B. Improved Modified Dry-Set Cement Mortar: ANSI A118.15.
   1. Manufacturers and Products:
      a. ARDEX X 5.
      b. Custom Building Products ProLite.
      c. LATICRETE 4-XLT.
      d. MAPEI Ultralite Mortar.
      e. Merkrete 820 Dustless Merlite.
      f. Sika Tile 500 LHT Lite.

2.5 GROUT MATERIALS

A. Source Limitations:
   1. Provide mortar and grout for each installation from single manufacturer.

B. Grout, General:
   1. Sanded Grout: Joints over 1/8 inch wide.
   2. Unsanded Grout: Joints 1/8 inch and less.

C. High Performance Cement Grout: ANSI A118.7.
   1. Manufacturers and Products:
      a. ARDEX FL Rapidset.
      b. Custom Building Products Prism Ultimate Performance.
      c. LATICRETE PERMACOLOR Select.
      d. MAPEI Ultracolor Plus FA.
      e. Merkrete Pro Grout Plus.
      f. Sika Tile 815 Secure Grout.
   2. Color: Architect selected.

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2.6 MEMBRANES

A. Contractor Option: Use fluid applied or chlorinated polyethylene sheet waterproofing and crack isolation membrane.

B. Waterproofing Membranes:
   1. Fluid Applied Waterproofing Membrane: ANSI A118.10, unreinforced latex rubber or elastomeric polymer.
      a. Manufacturers and Products:
         1) Ardex S1-K.
         2) Custom Building Products RedGard.
         3) LATICRETE HYDRO BAN.
         4) MAPEI Mapelastic Aqua Defense.
         5) Merkrete Hydro Guard SP1 Waterproof Membrane.
         6) SikaTile 100 Moisture Guard.
   2. Sheet Waterproofing Membrane: ANSI A118.10, reinforced polyethylene sheet.
      a. Manufacturers and Products:

1) Custom Building Products RedGard Fabric Membrane.
2) LATICRETE HYDRO BAN Sheet Membrane.
3) MAPEI Mapeguard CI with MAPEI SM Primer.
4) Schluter Systems KERDI.
5) SCHONOX AB.

C. Crack Isolation Membranes:
1. Fluid Applied Crack Isolation Membrane: ANSI A118.12, unreinforced latex rubber or elastomeric polymer.
a. Manufacturers and Products:
1) Custom Building Products RedGard.
2) Ardex S1-K.
3) LATICRETE HYDRO BAN.
4) MAPEI Mapelastic Aqua Defense.
5) Merkrete Fracture Guard.
6) Sika Tile 200 Fracture Guard.
2. Sheet Crack Isolation Membrane: ANSI A118.12, chlorinated polyethylene sheet.
a. Manufacturers and Products:
1) Noble Company NobleSeal TS.
3. Sheet Crack Isolation Membrane: ANSI A118.12, reinforced polyethylene sheet.
a. Manufacturers and Products:
1) Custom Building Products RedGard Fabric Membrane.
2) LATICRETE HYDRO BAN Sheet Membrane.
3) MAPEI Mapeguard WP 200.
4) Schluter Systems KERDI.
5) SCHONOX AB.

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D. Accessory Products: Membrane manufacturer primers, adhesives, reinforcing strips, transition mesh, joint sealants, and other products required for a complete installation.

2.7 MISCELLANEOUS MATERIALS

A. Vapor Retarders:
1. Polyethylene: ASTM D4397, 6 mil thickness.

B. Grout Sealer: Non-appearance-modifying water repellent.
1. Manufacturers and Products:
a. Custom Building Products Aqua Mix Penetrating Sealer.
b. LATICRETE STONETECH Sealer.
c. MAPEI UltraCare Penetrating Plus Stone Tile and Grout Sealer.

C. Metal Lath: ASTM C847 expanded flat mesh, 2.5 lb per sq yd, minimum.

2.8 SEALANTS

A. Joint Sealants: See Section 079200.
1. Color: Architect Selected.

2.9 PERFORMANCE

A. Dynamic Coefficient of Friction: Tested per ANSI A137.1 DCOF AcuTest.
   1. Level Floor Surfaces: 0.42 minimum.
   2. Ramp Surfaces: 0.80 minimum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrates are ready to receive tile Work, are firm, dry, clean, free of incompatible coatings, and follow ANSI A108.01.

B. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

C. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.

D. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

3.2 PREPARATION

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A. Concrete Substrates: Section 090561.
   1. Fill cracks, voids, and depressions in substrate with leveling compound specified in Section 035400.
   2. Grind off high spots and projections in substrate.
   3. Remove loose and foreign matter that could impede performance of tile.

B. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. General: Install tile and grout per ANSI A108.1 through ANSI A108.10 requirements and TCNA Handbook recommendations.
   1. Install thresholds, edge strips, and trim.

B. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

C. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

D. Waterproofing or Crack Isolation Membranes: Install per ANSI A108.17. Test waterproofing membrane for watertightness before installing tile.
   1. Verify that liquid-applied waterproofing membranes have 20 mil dry film thickness, minimum.

E. Lay out tile to minimize pieces less than half size. Locate cuts to be inconspicuous.

F. Lay tile to patterns shown on Drawings. Do not interrupt tile pattern through openings.

G. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners neatly.

H. Place tile with joints uniform in width, subject to variance in tolerance allowed in tile size. Make joints watertight, without voids, cracks, excess mortar, or excess grout.

I. Joint Widths:

J. Form internal angles coved and external angles square.

K. Install ceramic accessories rigidly.

L. Sound tile after setting. Replace hollow sounding units.

M. Movement Joints: TCNA Method EJ-171. Provide at following locations:
   1. Changes in backup material.
   2. Changes in plane.
   3. Over substrate joints.
   4. Interior Locations: 24 feet on center, maximum except 8 feet on center, maximum at direct sunlight exposed surfaces.
   5. Kitchen Floors: 10 feet on center, maximum.

N. Install joint backing and joint sealer per Section 079200.

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O. Stone Thresholds: Install in same setting material as adjacent floor.

P. Metal Edge Strips: Install at transitions between tile and other flooring material and at exposed edges of tile.

Q. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes per Section 079200.

R. Quarry Tile: Remove temporary wax coating before sealing.

S. Tile and Grout Sealer: Apply to quarry tile and cementitious grout joints. Remove excess.

3.4 CLEANING

A. Cleaning: Clean tile and grout surfaces. Remove grout residue, smears and haze.
   1. Clean in accordance with tile and grout manufacturer's written instructions.
   2. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned.
   3. Protect metal surfaces and plumbing fixtures from effects of cleaning.
   4. Flush surfaces with clean water before and after cleaning.

B. Protect tile with kraft paper or other covering to prevent damage and wear. Prohibit foot and wheeled traffic for seven days, minimum, after grouting.

C. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

3.5 INSTALLATION SCHEDULE - INTERIOR FLOOR TILE

A. Floors over Concrete, Thinset: Installation Method TCNA F122.
   1. Tile: Porcelain.
   2. Membrane: Fluid applied, Chlorinated polyethylene, or Reinforced polyethylene.
   3. Bond Coat: Improved Modified dry-set cement mortar.
   4. Grout: High performance cement grout.

B. Floors over Concrete, Thinset: Installation Method TCNA F122.
   1. Tile: Quarry tile.
   2. Membrane: Fluid applied, Chlorinated polyethylene, or Reinforced polyethylene.
   3. Bond Coat: Epoxy mortar.
   4. Grout: 100 percent solids epoxy grout.

C. Floors over Cracked Concrete, Thinset: Installation Method TCNA F125.
   1. Tile: Porcelain.
   2. Membrane: Full coverage, Fluid applied, Chlorinated polyethylene, or Reinforced polyethylene.
   3. Bond Coat: Improved Modified dry-set cement mortar.
   4. Grout: High performance cement grout.

D. Floors over Depressed Concrete, Unbonded Mortar Bed: Installation Method TCNA F111.
   1. Tile: Porcelain.
   2. Membrane: Cleavage membrane, ANSI A108.1A.
   3. Reinforcing: Metal reinforcing mesh.
   4. Unbonded Mortar Bed.

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3.6 INSTALLATION SCHEDULE - INTERIOR WALL TILE

A. Walls over Cementitious Backer Board on Wood or Metal Studs, Thinset: Installation Method TCNA W244C.
   1. Tile: Porcelain.
   2. Membrane: Fluid applied, Chlorinated polyethylene, or Reinforced polyethylene.
   3. Bond Coat: Improved Modified dry-set cement mortar.
   4. Grout: High performance cement grout.

B. Walls over Glass Mat Faced Gypsum Backer Board on Wood and Metal Studs, Thinset: Installation Method TCNA W245.
   1. Tile: Porcelain.
   2. Membrane: Fluid applied, Chlorinated polyethylene, and Reinforced polyethylene.
   3. Bond Coat: Improved Modified dry-set cement mortar.
   4. Grout: High performance cement grout.

END OF SECTION

SECTION 09 51 13

ACOUSTICAL PANEL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Acoustical panel ceiling systems.

B. Principal Products:
1. Acoustical panels.
2. Suspension grid.
3. Ceiling trim.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work results of this Section with ceiling supported elements.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Installers of lighting, security, HVAC, fire-suppression systems, and AV equipment.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Acoustical panels.
2. Suspension grid and trim.
3. Initial selection color and texture brochure and Samples.

B. Shop Drawings.
1. Show grid layout and panel identification for each acoustical panel ceiling.
2. Include mechanical and electrical items installed in ceilings.
3. Installation details for seismic design loads sealed by professional engineer responsible for seismic attachment and bracing design.
4. Perimeter mouldings and attachment details.

C. Samples:
1. Each acoustical panel type, standard size.
2. Each suspension grid type, 12 inch lengths with required colors.
3. Extruded aluminum trim, 12 inch lengths with required colors.

1.4 INFORMATIONAL SUBMITTALS

A. Delegated Design Submittals:
   1. Ceiling system seismic attachment and bracing.

B. Test and Evaluation Reports: Independent testing agency test results showing:
   1. Tension and compression force capabilities of main runner splices, cross runner connections, and expansion devices.
   2. Load capabilities of suspension system components.

C. Field Quality Control Submittals: Field inspection reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Warranty Documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Acoustical Panels: Unused panels plus minimum 96 square feet of each product installed.

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1.7 QUALITY ASSURANCE

A. Qualifications:
   1. Licensed Professionals: Registered in the State of California.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver products after building is fully enclosed.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

1.10 WARRANTY

A. Manufacturer Warranty:
   1. Ceiling Systems: Warrant against product and installation failure.

PART 2 PRODUCTS

2.1 ACOUSTICAL PANELS

A. Acoustical Panels:
   1. Manufacturers and Products: See Finish Schedule on Drawings.

2.2 SUSPENSION GRID

A. Non-Fire-Rated Grid: ASTM C635, heavy duty.
   1. Manufacturers and Products: See Finish Schedule on Drawings.
   2. Material: Steel; ASTM A653 G30 hot dip galvanized.
   3. Flange Caps: Painted steel or aluminum, width of system as recommended by manufacturer.
   4. Cap Color: See Drawings.

B. Hold Down Clips: Supplied by ceiling system manufacturer.

C. Impact Clips: Supplied by ceiling system manufacturer.

D. Seismic Accessories:
   1. Struts: Manufacturer standard compression struts designed to accommodate seismic forces.
   2. Clips: Manufacturer standard seismic clips designed and spaced to secure acoustical panels in place.

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2.3 CEILING TRIM

A. Decorative Ceiling Edge Trim: Extruded aluminum with concealed attachment to suspension grid and flush, splined joints; factory finished.
   1. Manufacturers and Products: See Finish Schedule on Drawings.
   2. Manufacturers and Products:
      a. Armstrong Axiom.
      b. CertainTeed Terminus.
      c. Rockfon Infinity.
      d. USG Compasso.
   3. Height: See Drawings.
   4. Color: Architect selected.

2.4 INSTALLATION MATERIALS

A. Hanger Attachment: Five times design load per ASTM C635, Table 1.

B. Wire Hangers: Galvanized steel wire.
   1. Diameter: Sized for three times hanger design load per ASTM C635, Table 1.

C. Rigid Hangers: One of the following types.
   1. Rods: Mild steel, minimum 1/4 inch diameter, hot dip galvanized per ASTM A153.
   2. Flat Strap: Mild steel, minimum 1 by 1/8 inch size, hot dip galvanized per ASTM A153.
   3. Angles: Formed steel sheet, minimum 7/8 inch legs and 0.040 thickness, hot dip galvanized per ASTM A123.

D. Acoustical Insulation: ASTM C665; unfaced fiberglass blankets, 4 inches thick.

E. Touch up Paint: Manufacturer recommended type, color to match acoustic and grid units.

2.5 PERFORMANCE

A. Delegate acoustical ceiling suspension system design to installer licensed Professional Engineer.

B. Seismic Design Criteria: See Structural Drawings.
   1. Category D: Install per ASTM C636, ASTM E580, and as follows.
      a. Suspension System: Heavy duty.
      b. Wall Molding: 2 inches wide, minimum.
      c. Attachment: Attach suspension system to two adjacent walls; 3/4 inch clearance at opposite walls.
      d. Tie main and cross tee ends together.
      e. Ceiling Areas 1,000 Square Feet and Larger: Provide horizontal restraint wire or rigid bracing.
      f. Ceiling Areas 2,500 Square Feet and Larger: Provide seismic separation joints.
      g. Ceilings Without Rigid Bracing: Provide 2 inch oversized trim rings for sprinkler heads and other penetrations.
      h. Changes in Ceiling Plane: Brace rigidly.
      i. Brace ceiling to structure, not to cable trays, electrical conduits, or piping.
      j. Perimeter Wires: Locate 8 inches from ends, maximum.
      k. Special Inspection required.

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2.6 FABRICATION

A. Fabricate decorative edge trim at factory to accurate curves without flat spots, kinks, or other distortion.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that hanger layout will not interfere with other Work.

B. Examine acoustical panels; discard panels that are wet, damaged, or exhibit mold.

C. Verify that major Work above ceiling is complete and inspected before installing grid.

3.2 INSTALLATION

A. Installation Reference Standards:
   1. ASTM C636.
   2. CISCA Ceiling Systems Handbook.
   3. Seismic Standard: ASTM E580.

B. Fully Loaded Deflection: 1/360, maximum.

C. Grid Layout:
   1. Locate system according to reflected plan.
   2. Locate system to balanced grid design with edge units not less than 50 percent of acoustic unit size. Arrange system with long dimension of panels parallel to long dimension of the space.

D. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible face plane displacement between adjacent members.

E. Space hanger wires 48 inches on center, maximum. Install additional hangers as needed to support light fixtures and ceiling supported equipment without exceeding deflection limit.

F. Space hanger rods 48 inches on center, maximum. Install additional hangers as needed to support light fixtures and ceiling supported equipment without exceeding deflection limit.

G. Where ducts or other equipment prevent regular hanger spacing, reinforce hangers to span extra distance or suspend steel channels horizontally and fasten hangers to channels.

H. Install decorative edge trim with plumb faces, concealed fasteners, and aligned joints.

I. Install grid so that components are level and accurately aligned.

J. Support tees on perimeter molding flanges.

K. Lay directional pattern units with pattern running as shown on Drawings.

L. Place acoustical panels flat on the suspension grid, ensuring they are even and unwarped.

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M. Cutting Acoustical Panels:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Cut profiles to match factory edges.
   3. Field paint exposed cut edges.

N. Lay acoustical insulation blankets in close contact to distance of 48 inches on both sides of partitions with acoustical insulation.

O. Install hold down and impact clips at manufacturer recommended spacing.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will employ independent inspection agency for periodic inspections of seismic rated suspended ceiling grids.
   1. Failed Test Retest Cost: Contractor responsibility.

B. Non-Conforming Work: Make corrections or replace, and reinspect.

3.4 ADJUSTING

A. Touch up minor scratches and abrasions to match factory finish.

B. lean exposed surfaces of acoustical tile ceilings, including trim and edge moldings.

C. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

D. Provide new components to replace damaged components that cannot be satisfactorily cleaned or repaired.

END OF SECTION

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SECTION 09 54 00

SPECIALTY CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Specialty ceilings.

B. Principal Products:
1. Linear metal ceilings.
2. Ceiling trim.

1.2 REFERENCES

A. Definitions:
1. Sheen Levels: ASTM D523.
a. Flat: Five gloss units at 60 degrees and 10 gloss units at 85 degrees, maximum.
b. Satin: 20 to 35 gloss units at 60 degrees and 35 gloss units minimum at 85 degrees.
c. Semi Gloss: 35 to 70 gloss units at 60 degrees.
d. Gloss: 70 gloss units at 60 degrees, minimum.

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work results of this Section with ceiling supported elements and ceiling penetrating elements.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Linear metal planks.
2. Panel fabrication and acoustical properties.
3. Suspension grid and trim.
4. Initial selection color and texture brochure and Samples.

B. Shop Drawings.
1. Show grid layout and panel identification for each ceiling.
2. Perimeter moldings and attachment details.
3. Include sprinklers, speakers, mechanical and electrical items installed in ceilings.

4. Installation details for seismic design loads sealed by professional engineer responsible for seismic attachment and bracing design.

C. Samples:
1. Each panel type, full size.
2. Each suspension grid type, 12 inch lengths with required colors.
3. Extruded aluminum trim, 12 inch lengths with required colors.
4. Sound absorber, 12 inch long.
5. End cap, full size.
6. Fabric: Full width by 24 inches; each type.

1.5 INFORMATIONAL SUBMITTALS

A. Delegated Design Submittals:
1. Ceiling system seismic attachment and bracing.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data.

B. Warranty Documentation.

1.7 MAINTENANCE MATERIAL SUBMITTALS

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A. Extra Stock Materials:
1. Ceiling Finish Components: Unused panels plus 2 percent, minimum, of installed materials.
2. Facing Fabric: Sufficient quantity to replace 6 panels.

1.8 QUALITY ASSURANCE

A. Field Samples: Construct ceilings, 96 by 96 inches, minimum size. Include wall moldings in Sample.
1. Approved Samples establish Work results standard.

B. Professional Engineer: Licensed in the State of California.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver products after building is fully enclosed.

B. Handle factory finished products to avoid damaging units and finishes.

1.10 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

1.11 WARRANTY

A. Manufacturer Warranty: Warrant against core warping, and fabric sagging, distortion, or delamination.
   1. Warranty Period: Three years.

PART 2 PRODUCTS

2.1 LINEAR METAL CEILINGS

A. Acoustical Metal Panel Ceilings: ASTM E1264.
   1. Manufacturers and Products:
      a. Basis of Design: See Finish Schedule on Drawings.
      b. Armstrong.
      c. Certainteed Saint-Gobain.
      d. Hunter Douglas.
   2. Sheet Metal Characteristics: Provide metal components exposed to view with smooth, flat surface without blemishes.
      a. Aluminum Sheet: ASTM B209.
      b. Steel Sheet: ASTM C635.
         1) Painted Finishes: Electrolytic zinc coated steel, ASTM A879, G12 coating.
         2) Chemical/Mechanical Finishes: Uncoated steel sheet, ASTM A1008.
   3. Profile: Perforated and Non perforated.
   4. Edge: Manufacturer standard.
   5. Accessories:
      a. End Caps: Match pans.
      b. Access Panels: Door hinge assembly and retainer clip for downward or upward opening.
   6. Fire Class: ASTM E84 Class A.
   7. Aluminum Finishes: Architect selected.
   8. Steel Finishes: Architect selected.

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2.2 SUSPENSION SYSTEMS

A. Non-Fire-Rated Grid: ASTM C635, heavy duty.
   1. Manufacturers and Products: Grid system recommended by system manufacturer.
   2. Material: Steel; ASTM A653 G30 hot dip galvanized.

B. Stabilizer Channels, Tees, and Bars: Manufacturer standard components.

C. Hold Down Clips: Supplied by ceiling system manufacturer; tested for listed fire rated assemblies.

D. Impact Clips: Supplied by ceiling system manufacturer.

E. Seismic Accessories:
   1. Struts: Manufacturer standard compression struts designed to accommodate seismic forces.
   2. Clips: Manufacturer standard seismic clips designed and spaced to secure acoustical panels in place.

2.3 CEILING TRIM

A. Moldings:
1. Material: Steel, painted finish matching grid.
2. Profile: See Drawings.

2.4 INSTALLATION MATERIALS

A. Hanger Attachment: Five times design load per ASTM C635, Table 1.

B. Wire Hangers: Galvanized steel wire.
1. Diameter: Sized for three times hanger design load per ASTM C635, Table 1.

C. Rigid Hangers: One of the following types.
1. Rods: Mild steel, minimum 1/4 inch diameter, hot dip galvanized per ASTM A153.
2. Flat Strap: Mild steel, minimum 1 by 1/8 inch size, hot dip galvanized per ASTM A153.
3. Angles: Formed steel sheet, minimum 7/8 inch legs and 0.040 thickness, hot dip galvanized per ASTM A123.

D. Acoustical Insulation: ASTM C665; unfaced fiberglass blankets, 3 inches thick.

E. Touch-up Paint: Type and color to match acoustic and grid units.

2.5 PERFORMANCE

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A. Delegate acoustical ceiling suspension system design to installer licensed Professional Engineer.

B. Seismic Design Criteria: See Structural Drawings.
1. Category D: Install per ASTM C636, ASTM E580, and as follows.
a. Suspension System: Heavy duty.
b. Wall Molding: 2 inches wide, minimum.
c. Attachment: Attach suspension system to two adjacent walls; 3/4 inch clearance at opposite walls.
d. Tie main and cross tee ends together.
e. Ceiling Areas 1,000 Square Feet and Larger: Provide horizontal restraint wire or rigid bracing.
f. Ceiling Areas 2,500 Square Feet and Larger: Provide seismic separation joints.
g. Ceilings Without Rigid Bracing: Provide 2 inch oversized trim rings for sprinkler heads and other penetrations.
h. Changes in Ceiling Plane: Brace rigidly.
i. Brace ceiling to structure, not to cable trays, electrical conduits, or piping.
j. Perimeter Wires: Locate 8 inches from ends, maximum.
k. Special Inspection required.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that hanger layout will not interfere with other Work.

B. Examine finish ceiling products; discard items that are wet, damaged, or exhibit mold.

C. Verify that major Work above ceiling is complete and inspected before installing grid.

3.2 INSTALLATION

A. Installation Reference Standards:
   1. ASTM C636.
   2. CISCA Ceiling Systems Handbook.
   3. Seismic Standard: ASTM E580/E580M.

B. Deflection: 1/360, maximum, when fully loaded.

C. Ceiling Strips: Stagger end joint splices minimum 12 inches joints.
   1. Set exterior end joints with 1/16 inch gap for expansion and contraction.
   2. Install panels to accommodate thermal expansion movement and maintain visual closure.
   3. Install edge moldings at intersections of soffit with other finishes, and at vertical surfaces; use maximum piece lengths.
   4. Exercise care when site cutting sight exposed finished components to ensure surface finish is not defaced.

D. Grid Layout:
   1. Locate system on room axis according to reflected plan.
   2. Locate system to balanced grid design with edge units not less than 50 percent of acoustic unit size. Arrange system with long dimension of panels parallel to long dimension of the space.

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E. Install frames and core panels level and in plane with adjacent panels.
   1. Fabric Application: Install monolithically, stretched tightly without puckers, ripples, or distortions.
      a. Fabric Direction: Architect selected.

F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible face plane displacement between adjacent members.

G. Space hanger wires 48 inches on center, maximum. Install additional hangers as needed to support light fixtures and ceiling supported equipment without exceeding deflection limit.

H. Where ducts or other equipment prevent regular hanger spacing, reinforce hangers to span extra distance or suspend steel channels horizontally and fasten hangers to channels.

I. Install decorative edge trim with plumb faces, concealed fasteners, and aligned joints.

J. Install grid so that components are level and accurately aligned.

K. Coordinate suspended decorative grid installation with suspension system and exposed molding and trim. Comply with CISCA, Metal Ceilings Technical Guidelines.

L. Support tees on perimeter molding flanges.

M. Perimeter Moldings: Fasten to substrates 16 inches on center, maximum.
   1. Install edge moldings at intersections of ceiling and vertical surfaces in acoustical sealant bed or with continuous gasket.
   2. Use longest practical lengths.

3. Outside Corners: Miter or overlap molding.
4. Inside Corners: Cut flanges and bend webs.
5. At round obstructions or penetrations, install factory formed closures that match perimeter molding.

N. Lay directional pattern units with pattern running one direction.

O. Place panels with edges resting flat on suspension grid in uniform plane free of warping.

P. Install hold down and impact clips at manufacturer recommended spacing.

3.3 TOLERANCES

A. Plane: 1/8 inch variation in 10 feet, maximum, measured in any direction.

B. Grid and Trim Plumbness: 2 degrees rotation variation, maximum.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will employ independent inspection agency for periodic inspections of seismic rated suspended ceiling grids.
1. Failed Test Retest Cost: Contractor responsibility.

B. Non Conforming Work: Make corrections or replace, and reinspect.

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3.5 ADJUSTING

A. Touch up minor scratches and abrasions to match factory finish.

B. Provide new components to replace damaged components that cannot be satisfactorily cleaned or repaired.

3.6 CLEANING

A. Clean exposed surfaces of acoustical tile ceilings, including trim and edge moldings. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove loose threads.

C. Remove dust and soiling without disturbing fabric texture.

END OF SECTION

SECTION 09 65 00

RESILIENT FLOORING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Resilient flooring.

B. Principal Products:
1. Resilient tile flooring.
2. Resilient base and accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Sections with completion of wet work, floor penetrations, and floor utilities.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Resilient flooring products.
2. Resilient accessories.
3. Installation materials.

B. Shop Drawings.
1. Shop Drawings: For each type of resilient flooring.
a. Include flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
b. Show details of special patterns.
2. Special patterns.

C. Product Schedule: Resilient flooring products, use same designations as drawings.

D. Samples:
1. Resilient Tile Flooring: Full sized Samples of each product.
2. Resilient Base: 12 inch length of each product.
3. Resilient Moldings: 12 inch length of each product.
4. Cap Strips: 12 inch Samples.

E. Welded Seam Samples: 12 by 12 inch Sample, 8 inches high applied to rigid backing showing welded seam and cove base corner.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For resilient sheet flooring, for tests performed by a qualified testing agency.

B. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For resilient flooring.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
1. Resilient Tile Flooring: Unused full tiles plus one box per every 50 boxes installed, but not less than one box.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

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B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Coordinate mockups in this Section with mockups specified in other Sections.
a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturers' labels indicating brand name and directions for storing.
2. Store resilient flooring indoors and within manufacturer recommended ambient temperature range.
3. Store resilient tile flooring on flat surfaces.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
2. Establish ambient conditions 48 hours, minimum before and maintain conditions during and 48 hours, minimum after installation.
3. Close spaces to traffic during resilient flooring installation.
4. Close spaces to traffic for 48 hours after resilient flooring installation.
5. Install resilient flooring after other finishing operations, including painting, have been completed.

PART 2 PRODUCTS

2.1 RESILIENT TILE FLOORING

A. Proprietary products are listed in the Finishes Schedule on the Drawings.
1. Substitutions: Permitted.

B. Luxury Vinyl Tile: ASTM F3261, textured vinyl tile with rigid polymer core.
1. Manufacturers and Products: See Finish Schedule on Drawings.
2. Type: B, Embossed.
3. Wear Layer: Grade I Commercial, 20 mil.
4. Overall Thickness: 4.5 mm.
5. Size: Manufacturer standard.
6. Color: See Finish Schedule.
7. Installation: Adhered.

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2.2 RESILIENT BASE

A. Proprietary products are listed in the Finishes Schedule on the Drawings.
1. Substitutions: Permitted.

B. Rubber Base: ASTM F1861 Type TP.
1. Manufacturers and Products: See Finish Schedule on Drawings.
2. Style: B, Cove.
3. Height: See Finish Schedule.
4. Color: See Finish Schedule.

2.3 RESILIENT MOLDINGS

A. Rubber Transition Strips:
1. Color: Architect selected.
2. Profiles: Architect selected.

2.4 PERFORMANCE REQUIREMENTS

A. Fire Test Response Characteristics:
1. Class I per ASTM E648, Critical Radiant Flux Classification.

2.5 INSTALLATION MATERIALS

A. Patching and Leveling Materials: Flooring manufacturer recommended products for applicable substrates.

B. Edge Strips: Rubber; profiles shown on Drawings.
   1. Colors: Architect selected.

C. Adhesives: Flooring manufacturer recommended water based product.
   1. VOC Content: 50 g/L, maximum.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that concrete floors have cured 28 days, minimum.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient flooring.

C. Moisture and Alkalinity Testing: See Section 090561.

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3.2 PREPARATION

A. Preparing Concrete Substrates: See Section 090561.

B. Prepare substrates in per flooring manufacturer written instructions.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient flooring until materials are the same temperature as space.
   1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient flooring.

3.3 TILE FLOORING INSTALLATION

A. Mix materials from multiple containers for consistent blend of colors.

B. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

C. Lay out tiles so that units at opposite walls are equal width and more than half size.

D. Install tiles in pattern directed by Architect.

E. Extend tile into recesses and under equipment.

F. Terminate tile flooring at centerline of doors where adjacent floor finish is dissimilar.

G. Scribe and cut tile for close fit at vertical surfaces so that cut edge will be concealed by wall base or other trim.

H. Install tile with full adhesive coverage.

I. Roll tile to eliminate entrapped air and ensure full adhesion.

J. Install edge strips where tile terminates against dissimilar flooring. Butt end seams tight.

3.4 BASE INSTALLATION

A. Installation:
1. Form tight joints.
2. Align the tops of bases with adjacent units.
3. Ensure continuous contact between base and substrate. Fill voids between base and substrate with manufacturer recommended filler material.
4. Do not stretch base.

B. Preformed Corners: Install formed pieces before straight pieces.

C. Job Formed Corners:
1. Outside Corners: Form bends without discoloration in corners.
2. Inside Corners: Cope.

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3.5 CLEANING AND PROTECTION

A. Remove excess adhesive.

B. Do not allow traffic on flooring until adhesives have fully set.

C. Provide surface protection during construction period.

D. Sweep and vacuum surfaces thoroughly.

E. Damp-mop recently completed surfaces.

F. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 09 68 13

TILE CARPETING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Tile carpeting.

B. Principal Products:
1. Tile carpet.
2. Edge strips and transitions.
3. Installation materials.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this section with completion of other finishes.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Each type of modular carpet tile.
2. Edgings.
3. Cap strips.
4. Initial selection color and pattern Samples.

B. Shop Drawings: Mark information on copies of floor plans.
1. Starting points for layout and alignment of tiles.
2. Pattern directions.
3. Type, color, and location of insets and borders.
4. Type, color, and location of edge, transition, and other accessory strips.

C. Schedule: Modular carpet tile types and patterns.

D. Samples:
1. Carpet Tiles: Full sized Samples of each type.
2. Edging: 12 inch long sections.
3. Cap Strips: 12 inch long sections.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Installer.

B. Product Test Reports.

C. Sample Warranties.
   1. Include manufacturer written data on product characteristics.
   2. Include manufacturer written installation instructions for each substrate.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Carpet Tile: One full carton for each 50 cartons installed, but not less than five carton.
      a. Obtain from same runs as installed carpet tiles.

1.7 QUALITY ASSURANCE

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A. Installer Qualifications: International Certified Flooring Installers Commercial II certification.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
   1. Store products inside building.

B. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.

1.9 FIELD CONDITIONS

A. Do not start installation until painting and similar finish Work are complete.

B. Ambient Conditions:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

1.10 WARRANTY

A. Manufacturer Warranty:
   1. Carpet Tile: Warrant against product failure, including:
      a. Defective materials.
      b. Excessive fading.
      c. Loss of static control.
      d. Edge raveling.
      e. Runs.
      f. Loss of tuft bind strength.
      g. Loss of face fiber.
      h. Excessive wear.
   2. Warranty Period: Ten years.

PART 2 PRODUCTS

2.1 CARPET TILE

A. Carpet Tile:
   1. Manufacturers and Products: See Finish Schedule on Drawings.
   2. Installation Pattern: See drawings.

2.2 PERFORMANCE

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A. Emissions: CRI Green Label Plus compliant products.

B. Fire Characteristics:
   1. Critical Radiant Flux Classification: Class I, 0.45 W/sq. cm.
   2. Flammability: Pass DOC FF-1 Pill Test.

2.3 INSTALLATION MATERIALS

A. Substrate Patching and Leveling: Latex modified hydraulic cement product.

B. Adhesive: Waterproof, mildew resistant, latex based adhesive formulated specifically for installing carpet tiles.
   1. VOC Content: 50 g/L, maximum.

C. Edgings:
   1. Profiles: See Drawings.
   2. Material: Rubber or Vinyl.
      a. Color: Architect selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify concrete floors have cured minimum 28 days.

B. Moisture and Alkalinity Testing: Section 090561.

C. Examine carpet tile for type, color, pattern, and potential defects.

3.2 PREPARATION

A. General: Comply with CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, in accordance with manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

D. Concrete Substrates: Section 090561.

E. Wood Substrates:
   1. Sand to remove ridges and high areas.
   2. Vacuum clean.

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3.3 INSTALLATION

A. Follow CRI 104 Section 18, Modular Carpet Modules.
   1. Installation Method: Glue down; install every tile with releasable adhesive.

B. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

C. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

D. Lay out each room or area. Minimize tiles less than one half size.

E. Mix carpet tiles from different cartons.

F. Cut tile clean. Fit tiles tight to intersection with vertical surfaces without gaps.

G. Lay carpet tiles with pile direction as shown on Shop Drawings.

H. Locate change of color or pattern between rooms under door centerline.

I. Bind exposed cut edges or conceal under edge trim.

J. Edges:
1. Install edge strips where carpet tiles abut dissimilar flooring materials.
2. Center strips under doors where carpet tiles terminate at door openings.
3. Adhere strips to subfloor in longest practical lengths; butt ends tight.
4. Scribe to abutting surfaces.

3.4 CLEANING

A. Remove soiling and stains.
1. Remove excess adhesive and other surface blemishes using cleaner recommended in writing by carpet tile manufacturer.

B. Cut loose threads flush with top surface.

C. Clean with commercial vacuum cleaner.

3.5 PROTECTION

A. Protect carpet tile against soiling and wear during remaining construction period.

B. Provide hardboard or other rigid panel protection where subject to wheeled or heavy foot traffic.

C. Protect installed carpet tile to comply with CRI 104, Section 13.7.

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END OF SECTION

SECTION 09 72 00

WALL COVERINGS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Wall coverings.

B. Principal Products:
1. Wall coverings.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with the completion of wet work.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

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1.3 ACTION SUBMITTALS

A. Product Data: Each type of wall covering.

B. Schedule: Use same designations indicated on Drawings.

C. Shop Drawings: Wall elevations with seaming layout.
1. Include location schedule by room number and wall covering type that correspond to Drawings.

D. Samples:
1. Wall Coverings: 12 by 12 inches in size.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: Cleaning recommendations.

1.5 MAINTENANCE MATERIALS

A. Extra Stock Materials:
1. Wall Covering: 9 linear yards of each product.
2. Wall Covering: 5 percent of installed materials; 1 roll, minimum.

1.6 QUALITY ASSURANCE

A. Qualifications:
   1. Installers: Approved by manufacturer.

B. Field Samples: Apply wall covering; full height, 2 rolls wide. Demonstrate texture, color, and pattern.
   1. Approved Samples establish Work results standard.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials indoors, in a dry area, away from UV, and elevated off the ground.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

1.8 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations.
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.
   2. Lighting: Permanent lighting or temporary illumination providing 80 footcandles at mid-height of wall, minimum.

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PART 2 PRODUCTS

2.1 WALL COVERINGS

A. Wall Covering:
   1. Manufacturers and Products: See Finish Schedule on Drawings.

2.2 PERFORMANCE

A. Surface Burning: ASTM E84 Class A.
   1. Flame Spread Index: 25, maximum.
   2. Smoke Developed Index: 50, maximum.

2.3 INSTALLATION MATERIALS

A. Adhesive: Manufacturer recommended type to suit application, mildew resistant and Water based type.
   1. VOC Content: 50 g/L, maximum.

B. Termination Trim: Extruded plastic.
   1. Color: Architect selected.

C. Substrate Filler: Adhesive and wall covering manufacturer recommended; compatible with substrate.

D. Substrate Primer and Sealer: Section 099000.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces are prime painted and ready to receive Work.

B. Preinstallation Testing: Test moisture content of substrate does not exceed the following:
1. Gypsum Board: 12 percent.

C. Verify substrate surfaces are ready to receive Work.

D. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet nor vary at rate greater than 1/16 inch per foot.

3.2 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with tetrasodium or trisodium phosphate, rinse and neutralize; wipe dry.

C. Surface Appurtenances: Remove electrical plates, hardware, light fixture trim, escutcheons, and fittings before preparing surfaces or finishing.

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D. Surfaces: Correct defects and clean surfaces. Remove existing coatings that exhibit loose surface defects.

E. Marks: Seal with shellac those which may bleed through surface finishes.

F. Vacuum surfaces.

3.3 INSTALLATION

A. Install wall covering in pattern sequence.

B. Razor trim edges on flat work table, changing blade often to prevent rough cut edges. Do not razor cut on gypsum board surfaces.

C. Apply covering smooth, without wrinkles, gaps or overlaps. Eliminate air pockets and ensure full bond to substrate surface. Butt edges tight.

D. Match pattern 72 inches above finished floor.

E. Horizontal seams are not acceptable.

F. Do not seam within 2 inches of internal corners nor within 6 inches of external corners.

G. Install wall covering before installation of bases, cabinets, hardware, and wall mounted items Install 1/4 inch, minimum, below top of resilient base.

H. Apply wall covering behind radiation and convector covers.

I. Where wall covering tucks into reveals or wall base, extend contact adhesive within 6 inches of wall covering termination. Ensure full contact bond.

J. Install termination trim.

K. Remove excess adhesive. Wipe clean with dry cloth.

3.4 CLEANING

A. Clean wall coverings of excess adhesive, dust, dirt, and other contaminants.

B. Reinstall wall plates and accessories removed before Work of this section.

3.5 PROTECTION

A. Protect wall coverings from damage throughout the construction.

END OF SECTION

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SECTION 09 90 00

PAINTING AND COATING

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Painting and coating.

B. Principal Products:
1. Exterior paint systems.
2. Interior paint systems.
3. High-performance coating systems.

1.2 REFERENCES

A. Definitions:
1. Sheen Levels: ASTM D523.
a. Flat: Five gloss units at 60 degrees and 10 gloss units at 85 degrees, maximum.
b. Eggshell: 10 to 25 gloss units at 60 degrees and 10 to 35 gloss units at 85 degrees.
c. Satin: 20 to 35 gloss units at 60 degrees and 35 gloss units minimum at 85 degrees.
d. Semigloss: 35 to 70 gloss units at 60 degrees.
e. Gloss: 70 gloss units at 60 degrees, minimum.

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this Section with completion of substrates.

B. Preinstallation Meeting:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Gypsum board installers.
3. Additional Agenda Items:
a. Review moisture testing requirements and results.
b. Review substrate preparation requirements and methods.

1.4 ACTION SUBMITTALS

A. Product Data.
1. Initial selection color chip sheets.

B. Samples:
1. Draw Down Samples: Each type of paint system and each topcoat color and gloss.
a. Label each Sample for paint system, location, and substrate.

C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in applicable exterior painting schedule articles to cross-reference paint systems specified in this Section. Include color designations.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data:
1. Cleaning, touch up, and repair instructions for painted and coated surfaces.
2. Area summary with finish schedule and Samples, designating where each product, color and finish was used.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
1. Paint from same product run as installed materials.
a. Quantity: 5 percent, but not less than 1 gallon of each material and color.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store paint products in sealed containers until ready for use.

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1.8 FIELD CONDITIONS

A. Apply materials only when surface and ambient temperatures are within temperature ranges required by paint product manufacturer.

B. Apply exterior coatings when rain or snow are not occurring or forecasted, and when relative humidity is inside humidity ranges, and moisture content of surfaces is within acceptable levels required by paint product manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers:
1. BEHR.
2. Benjamin Moore.
3. PPG Paints.
4. Scuffmaster.
5. Sherwin-Williams.
6. Tnemec.

B. Products: Scheduled in this Section.

2.2 PAINT, GENERAL

A. Colors: Basis of design manufacturer designations, see Finish Schedule on Drawings.

B. Paint Systems: Primers, intermediate coats and topcoats compatible with substrates and one another.

C. Obtain each paint product from single source from single manufacturer.

D. Coatings: Ready mixed or field catalyzed.

E. Preparation:
1. Mix to soft paste consistency, capable of being readily and uniformly dispersed to homogeneous coating.
2. Blend tints and catalyzers to uniform consistency and color, capable of drying or curing free of streaks or sags.

2.3 SUSTAINABILITY CHARACTERISTICS

A. VOC Content: Follow VOC limits of authorities having jurisdiction.

B. Low Emitting Materials: Follow California Department of Public Health, Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

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2.4 SOURCE QUALITY CONTROL

A. Tests:
1. Testing: Owner will engage a testing agency to sample paint materials delivered to Project site or taken from Supplier facility.
2. Acceptance Criteria: Products follow specified requirements.

B. Non-Conforming Work: Remove materials from substrates, pay for testing replacement products, and repaint surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify substrates are ready to receive Work.
1. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers. Proceed with coating application only after unsatisfactory conditions have been corrected.
a. Application of coating indicates acceptance of substrates and conditions.

B. Preinstallation Testing: Test moisture content of substrate does not exceed the following:
1. Concrete: 12 percent.
2. Masonry: 12 percent.
3. Wood: 15 percent.
4. Gypsum Board: 12 percent.

C. Gypsum Board: Verify finishing compound is dried and sanded smooth.

D. Plaster: Verify plaster is cured.

E. Concrete: Verify surface has cured at least 30 days and surface pH is between 6 and 9.

F. Masonry: Verify surface has cured at least 30 days and surface pH is between 6 and 9.

3.2 PREPARATION

A. Surface Preparation: Remove electrical plates, hardware, trim, escutcheons, and fittings. Correct defects in substrates capable of affecting Work.

B. Cleaning: Remove substances that could impair paint bond, including dust, oil, grease, and incompatible coatings.
   1. Impervious Surfaces: Remove mildew by scrubbing with cleaning solution recommended by finish coating manufacturer. Rinse with clean water and allow surface to dry.
   2. Aluminum Surfaces: Remove surface contamination by steam or high pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
   3. Asphalt, Creosote, or Bituminous Surfaces: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
   4. Concrete Floors: See Section 090561.
   5. Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
   6. Plaster Surfaces: Fill cracks, holes, and other imperfections with latex patching plaster. Blend texture with adjacent surfaces. Clean and allow to dry.
   7. Concrete and CMU Surfaces: Remove dirt, loose mortar, scale, efflorescence and chalk. Remove oil and grease by scrubbing with cleaning solution recommended by finish coating manufacturer. Rinse with clean water and allow surface to dry.
   8. Non-Passivated Galvanized Surfaces: Smooth and hand or power tool clean per ASTM D6386.
   9. Passivated Galvanized Surfaces: Remove soluble and insoluble contaminants and corrosion. Sweep blast per ASTM D6386 to achieve uniform 1.0 to 2.0 mil anchor profile.
   10. Uncoated Steel: Remove rust and loose mill scale. Clean per SSPC-SP3 Power Tool Cleaning.
   11. Primed Steel: Clean field welds, fasteners, and abraded shop primer.
   12. Wood Surfaces:
      a. Wipe off dust and grit. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried.
      b. Backprime concealed surfaces.

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3.3 APPLICATION

A. Follow manufacturer instructions for application method, thickness of coatings, and number of coats.
   1. Apply finishes when surfaces are dry. Allow applied coats to dry before next coat is applied.
   2. Apply each coat of paint slightly darker than preceding coat.
   3. Apply coatings to uniform appearance.
   4. Sand wood and metal surfaces lightly between coats.
   5. Leave labels unpainted.

B. Appearance:
   1. Apply paints without imperfections.
   2. Edges and Color Breaks: Produce sharp edges.

3. Application of coating indicates acceptance of substrates and conditions.
4. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Field Tests and Inspections: Engage inspectors to perform tests and inspections and prepare reports. Allow inspectors access to Work areas.
   1. Failed Test Retest Cost: Contractor responsibility.

B. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

C. Testing: Dry film thickness.

D. Non-Conforming Work: Remove and replace or apply additional coats, and retest.

3.5 CLEANING

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A. Remove rubbish, empty cans, rags, and other discarded materials.

B. Remove splattered paints. Protect adjacent surfaces from damage.

3.6 PROTECTION

A. Protect painted surfaces from subsequent Work. Touch up and restore damaged painted surfaces.

3.7 INTERIOR PAINTING SCHEDULE

A. Concrete Walls and Ceilings, Dry Environments:
   1. Latex primer:
      a. BEHR: Multi-Surface Interior/Exterior Primer & Sealer 436.
      b. Benjamin Moore: Ultra Spec Masonry 100% Acrylic Sealer 608.
      c. PPG Paints: Perma-Crete Interior/Exterior Alkali Resistant Primer 4-603XI.
      d. Sherwin-Williams: Loxon Concrete & Masonry Primer, LX02 Series.
      e. Sika-UGL Drylok Extreme.
      f. Tnemec: Series 151 Elasto-Grip.
   2. Acrylic Latex Enamel: Eggshell finish.
      a. BEHR: Behr Pro i300 Interior.
      b. Benjamin Moore; Ultra Spec 500 Series.
      c. PPG Paints: SPEEDHIDE Zero Interior Latex.
      d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.
      e. Sika-UGL Drylok Extreme.
      f. Tnemec: Series 1028 Enduratone gloss.

3. Water Based Epoxy Topcoat: Eggshell finish.
    a. BEHR: Behr Pro Pre-Catalyzed Waterborne Epoxy.
    b. Benjamin Moore: COROTECH WB Pre-Cat Epoxy Coating.
    c. PPG Paints: Pitt-Glaze WB1 Interior Pre-Catalyzed Acrylic Epoxy.
    d. Sherwin-Williams: Pro Industrial Pre Catalyzed Epoxy, K45/K46 Series.
    e. Tnemec: Series 113/114 H.B. Tneme-Tufcoat.

B. Concrete Walls and Ceilings, Wet Environments:
1. Epoxy Primer:
    a. Benjamin Moore: Corotech Surface Tolerant Epoxy Mastic, V160.
    b. PPG Paints: Perme-Crete Concrete Block & Masonry Surfacer/Filler 4-100XI.
    c. Sherwin-Williams: Macropoxy 646-100 Fast Cure Epoxy.
    d. Tnemec Series N69 High Build Epoxoline II.
2. Epoxy Topcoat: Eggshell finish.
    a. Benjamin Moore: Corotech Waterborne Acrylic Epoxy V450.
    b. PPG Paints; Aquapon WB EP Epoxy.
    c. Sherwin-Williams: Pro Industrial Water Based Catalyzed Epoxy B73 Series.
    d. Tnemec: Series N69 High Build Epoxoline II.

C. Gypsum Board Walls:
1. Latex Primer:
    a. BEHR: Drywall Plus Interior Primer & Sealer 73.
    b. Benjamin Moore: Ultra Spec 500 Interior Latex Primer N534.
    c. PPG Paints: SPEEDHIDE zero Interior Latex Sealer 6-4900XI.
    d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex Primer B28W02600.
    e. Tnemec: Series 151 Elasto-Grip.
2. Acrylic Latex Enamel: Flat or Eggshell finish.
    a. BEHR: Behr Pro i300 Interior.
    b. Benjamin Moore: Ultra Spec 500 Series.
    c. PPG Paints: SPEEDHIDE Zero Interior Latex.
    d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.
    e. Tnemec: Series 1028 Enduratone gloss.
3. Epoxy Topcoat: Eggshell finish.
    a. BEHR: Behr Pro Pre-Catalyzed Waterborne Epoxy.
    b. Benjamin Moore: Corotech Pre Catalyzed Epoxy.
    c. PPG Paints; PITT-GLAZE WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy.
    d. Sherwin-Williams: Pro Industrial Pre-Catalyzed Water Based Epoxy.
    e. Tnemec: Series 113/114 H.B. Tneme-Tufcoat.

D. Gypsum Board Ceilings:
1. Latex Primer:
    a. BEHR: Drywall Plus Interior Primer & Sealer 73.
    b. Benjamin Moore: Ultra Spec 500 Interior Latex Primer N534.
    c. PPG Paints: SPEEDHIDE zero Interior Latex Sealer 6-4900XI.
    d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex Primer B28W02600.
    e. Tnemec: Series 151 Elasto-Grip.
2. Acrylic Latex Enamel: Flat finish.
    a. BEHR: Behr Pro i300 Interior.
    b. Benjamin Moore: Ultra Spec 500 Series.
    c. PPG Paints: SPEEDHIDE Zero Interior Latex.
    d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.
    e. Tnemec: Series 1026 Enduratone matte.

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E. Steel Doors and Frames:
   1. Pre Primed Metal: Touch up with same shop primer product used by manufacturer.
   2. Latex Primer:
      a. BEHR: Multi-Surface Interior/Exterior Primer & Sealer 436.
      b. Benjamin Moore: Ultra Spec HP Acrylic Metal Primer HP04.
      c. PPG Paints: Pitt-Tech Plus DTM 4020PF.
      d. Sherwin-Williams: Pro Industrial Pro-Cryl Universal Primer B66-1310 Series.
      e. Tnemec: Series 115 UniBond DF.
   3. Acrylic Latex Enamel: Semigloss finish.
      a. BEHR: PREMIUM Interior/Exterior Direct to Metal Paint.
      b. Benjamin Moore: Ultra Spec HP D.T.M Acrylic Enamel.
      c. PPG Paints: Pitt-Tech Plus Interior/Exterior DTM Industrial Enamel 4216 SG or 90 Series.
      d. Sherwin-Williams: Pro Industrial Acrylic.
      e. Tnemec: Series 1029 Enduratone low semigloss.
   4. Waterbased Alkyd Enamel: Semigloss finish.
      a. BEHR: Urethane Alkyd Enamel.
      b. Benjamin Moore: ADVANCE Waterborne Interior Alkyd.
      c. PPG Paints: SPEEDHIDE Interior/Exterior WB Alkyd.
      d. Sherwin-Williams: ProMar 200 Interior Waterbased Acrylic-Alkyd.
      e. Tnemec: Series 2H Hi-Build Tneme-Gloss.
   5. Epoxy Topcoat: Semigloss finish.
      a. BEHR: Behr Pro Pre-Catalyzed Waterborne Epoxy.
      b. Benjamin Moore: Corotech Pre Catalyzed Epoxy.
      c. PPG Paints; PITT-GLAZE WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy.
      d. Sherwin-Williams: Pro Industrial Pre-Catalyzed Water Based Epoxy.
      e. Tnemec: Series 113/114 H.B. Tneme-Tufcoat.

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F. Galvanized Steel Substrates:
   1. Latex Primer:
      a. BEHR: Multi-Surface Interior/Exterior Primer & Sealer 436.
      b. Benjamin Moore: Ultra Spec HP Acrylic Metal Primer HP04.
      c. PPG Paints: Pitt-Tech Plus DTM 4020PF.
      d. Sherwin-Williams: Pro Industrial Pro-Cryl Universal Primer B66-1310 Series.
      e. Tnemec: Series 115 UniBond DF.
   2. Acrylic Latex Enamel: Semigloss finish.
      a. BEHR: PREMIUM Interior/Exterior Direct to Metal Paint.
      b. Benjamin Moore: Ultra Spec HP D.T.M Acrylic Enamel.
      c. PPG Paints: Pitt-Tech Plus EP DTM.
      d. Sherwin-Williams: Pro Industrial Acrylic.
      e. Tnemec: Series 115 UniBond DF.

G. Wood:
   1. Latex Primer:
      a. BEHR: Drywall Plus Interior Primer & Sealer 73.
      b. Benjamin Moore: Advance Waterborne Interior Alkyd Primer 790.
      c. PPG Paints: Seal-Grip Interior/Exterior Universal Primer/Sealer 17-921XI.
      d. Sherwin-Williams: PrepRite ProBlock Interior/Exterior Latex Primer/Sealer B51-600.
      e. Tnemec: Series 151 Elasto-Grip.
   2. Acrylic Latex Enamel: Semigloss finish.
      a. BEHR: Behr Pro i300 Interior.
      b. Benjamin Moore: Ultra Spec 500 Series.
      c. PPG Paints: SPEEDHIDE Zero Interior Latex.

d. Sherwin-Williams: ProMar 200 Zero VOC Interior Latex.
e. Tnemec: Series 1029 Enduratone low semigloss.

3. Epoxy Topcoat: Semigloss finish.
   a. BEHR: Behr Pro Pre-Catalyzed Waterborne Epoxy.
   b. Benjamin Moore: Corotech Pre Catalyzed Epoxy.
   c. PPG Paints; PITT-GLAZE WB1 Interior Pre-Catalyzed Water-Borne Acrylic Epoxy.
   d. Sherwin-Williams: Pro Industrial Pre-Catalyzed Water Based Epoxy.
   e. Tnemec: Series 113/114 H.B. Tneme-Tufcoat.

3.8 EXTERIOR PAINTING SCHEDULE

A. Unprimed Ferrous Metal:
   1. Rust Inhibitive Alkyd Primer:
      a. BEHR: Interior/Exterior Metal Primer 435.
      b. Benjamin Moore: Super Spec HP Alkyd Metal Primer P06.
      c. PPG Paints: Multiprime 4360.
      d. Sherwin-Williams: Kem Bond HS, B50 Series.
      e. Tnemec: Series V10 Tnemec Primer.
   2. Latex Topcoat: Semigloss finish.
      a. BEHR: PREMIUM Direct to Metal Semi-Gloss Paint 3200.
      b. Benjamin Moore: Ultra Spec HP D.T.M. Acrylic HP29.
      c. PPG Paints: Pitt-Tech Plus EP DTM 90-1610.
      d. Sherwin-Williams: A-100 Series.
      e. Tnemec: Series 1029 Enduratone.

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B. Galvanized Steel:
   1. Primer:
      a. BEHR: Multi-Surface Interior/Exterior Primer & Sealer 436.
      b. Benjamin Moore: Ultra Spec HP D.T.M. Acrylic HP29.
      c. PPG Paints: Pitt-Tech Plus DTM Primer 4020PF.
      d. Sherwin-Williams: Pro Industrial ProCryl Universal Primer B66-1300 Series.
      e. Tnemec: Series 115 UniBond DF.
   2. Latex Topcoat: Semigloss finish.
      a. BEHR: PREMIUM Direct to Metal Semi-Gloss Paint 3200.
      b. Benjamin Moore: Ultra Spec HP D.T.M. Acrylic HP29.
      c. PPG Paints: Pitt-Tech Plus EP DTM 90-1610.
      d. Sherwin-Williams: A-100 Series.
      e. Tnemec: Series 1029 Enduratone.

C. Portland Cement Plaster:
   1. Alkali Resistant Primer:
      a. BEHR: Multi-Surface Interior/Exterior Primer & Sealer 436.
      b. Benjamin Moore: Ultra Spec Masonry 100% Acrylic Sealer 608.
      c. PPG Paints: PERMA-CRETE Interior/Exterior Alkali Resistant Primer.
      d. Sherwin-Williams: Loxon Concrete & Masonry Primer, LX02 Series.
      e. Sika-UGL Drylok Wet Wall Bonding Primer.
      f. Tnemec: Series 151 Elasto-Grip.
   2. Acrylic Latex Topcoat: Eggshell finish.
      a. BEHR: PRO e600 Exterior.
      b. Benjamin Moore: Ultra Spec Exterior.
      c. PPG Paints: SPEEDHIDE Exterior 100% Latex.
      d. Sherwin-Williams: A-100 Latex.

e. Sika-UGL Drylok Original.
f. Tnemec: Series 1029 Enduratone low semigloss.

END OF SECTION

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SECTION 10 14 23

PANEL SIGNAGE

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Room identification, way finding, and code required signage.

B. Principal Products:
1. Signs.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this section with completion of substrates.

1.3 ACTION SUBMITTALS

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A. Product Data:
1. Each type of sign.
2. Initial Selection: Sign styles, color Samples, and character styles and character colors.

B. Shop Drawings: Sign styles, lettering font, foreground and background colors, overall dimensions of each sign.
1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by other installers, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Schedule: Locations of each sign type, description of graphics, and message text.

D. Samples: Each sign type. Acceptable Samples may be installed in the Work.
1. Initial Selection: For each type of sign assembly, exposed component, and exposed finish.
a. Include representative Samples of available typestyles and graphic symbols.
2. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:
a. Signs: Full-size Sample.
b. Variable Component Materials: Full-size Sample of each base material, character (letter, number, and graphic element) in each exposed color and finish not included in Samples above.
c. Full-size Samples, if approved, will be returned to Contractor for use in Project.

1.4 NFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Materials:
   1. Changeable Slide Strips: three per sign.

1.7 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturers: Acceptable to Owner.
   2. Installer: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING

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A. Package signs labeled in name groups.

B. Store adhesive attachment tape at ambient room temperatures.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Field Measurements: Verify locations of anchorage devices embedded in permanent construction by other installers by field measurements before fabrication, and indicate measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 INTERIOR ROOM IDENTIFICATION AND CODE-REQUIRED SIGNS

A. Room Identification and Code-Required Signs: Raised character acrylic plastic signs.
   1. Total Thickness: 1/8 inch.
   2. Sizes, Shapes: See Drawings.
   3. Character Style: Architect selected ADA compliant characters.
   4. Colors: Architect selected.
   5. Graphics: Owner will supply electronic files and color requirements for sign graphics.

6. Mounting: Drill signs to receive exposed metal fasteners.

2.2 DESIGN CRITERIA

A. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.3 MATERIALS

A. Acrylic Sheet: ASTM D4802, manufacturer standard, UV filtering.

B. Adhesive Tape: Zero VOC.

2.4 FABRICATION

A. Factory assemble signs.

B. Mill joints to a tight, hairline fit. Form assemblies and joints exposed to weather to resist water penetration and retention.

C. Conceal connections if possible; otherwise, locate connections where they are inconspicuous.

D. Provide rabbets, lugs, and tabs necessary to assemble components and to attach to existing work. Drill and tap for required fasteners. Use concealed fasteners where possible; use exposed fasteners that match sign finish.

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E. Subsurface-Applied Graphics: Apply graphics to back face of clear face-sheet material to produce precisely formed image. Image shall be free of rough edges.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean substrates to ensure secure adhesive mounting.

3.2 INSTALLATION

A. Install signs after doors and wall surfaces are finished.

B. Follow accessibility requirements.

C. Install signs plumb and level at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.

D. Install signs with exposed fasteners to lay flat against wall and do not protrude or obstruct according to the accessibility standard.

E. Clean signs before and after installation.

3.3 SIGN LOCATIONS

A. Locate room identification signs on wall surfaces adjacent to strike side of door, 5 feet above finished floor to center line of sign and 3 inches from door jamb trim.

B. Locate unit entry identification signs on wall surfaces adjacent to strike side of door, 5 feet above finished floor to center line of sign and 3 inches from door jamb trim.

C. Locate informational signs on wall surfaces, 5 feet above finished floor to center line of sign at scheduled locations.

END OF SECTION

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TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Toilet compartment systems.

B. Principal Products:
1. Solid plastic toilet compartments.
2. Hardware and installation accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordination: Coordinate locations of concealed blocking and support framing in walls and ceilings.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Installers of blocking.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Standard construction details.
2. Initial selection color Samples.

B. Shop Drawings.
1. Plans, elevations, sections, and attachment details.
2. Show toilet accessory cutouts and blocking.
3. Show floor drain locations.

C. Samples:
1. Hardware and Accessories: Full sized Samples of each type and color. Approved Samples may be incorporated into Work.
2. Panel Material: 6 by 6 inch Samples of same thickness and material as finished Work in each required color.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments.

1.5 FIELD CONDITIONS

A. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 SOLID PLASTIC TOILET COMPARTMENTS

A. Plastic Toilet Compartments: Solid, homogenous HDPE high density polyethylene.
   1. Manufacturers and Products:
      a. Scranton Products; Hiny Hiders as basis of design.
      b. All American Metal Corp.
      c. American Sanitary Partition Corporation.
      d. ASI Accurate Partitions Corporation.
      e. ASI Global Partitions.
      f. Bradley Corporation; Mills Partitions.
      g. General Partitions Mfg. Corp.
      h. Hadrian Manufacturing Inc.
      i. Knickerbocker Partition Corporation.
      j. Marlite.
      k. Metpar Corp.
   2. Toilet Enclosure Configuration:
      a. Overhead braced.
      b. Floor anchored.
   3. Urinal Screen Configuration:
      a. Wall hung, flat panel.
   4. Finish: See Finish Schedule for finish and color.

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B. Provide zero sightline products.

C. Doors, Panels, and Pilasters:
   1. Doors, Panels and Pilasters: manufacturer standard thicknes; edges radiused and finished smooth.
   2. Hinge Type: Continuous piano.
   3. Pilaster Shoes and Sleeves: Manufacturer standard design as selected by Architect.

D. Urinal Screen Panels: Match toilet enclosures.

2.2 HARDWARE AND INSTALLATION ACCESSORIES

A. Hardware: Panel manufacturer heavy duty operating hardware and accessories.
   1. Material: As selected by Architect from manufacturer full range.
   2. Hinges: See compartments articles.
   3. Latches and Keepers: Surface-mounted latch unit with combination rubber faced door strikes and keepers.
   4. Coat Hooks: Combination hook and rubber tipped bumpers.
   5. Door Pulls: Manufacturer heavy duty cast stainless steel pull unit at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Mounting Brackets:
   1. Stirrup Brackets: Ear- or U-brackets, stainless steel.
   2. Continuous Brackets: Manufacturer standard design; stainless steel.

C. Overhead Bracing: Extruded aluminum rail with antigrip profile; manufacturer standard finish.

D. Anchorages and Fasteners: Stainless steel, finished to match the items they are securing, with tamper resistant heads.
   1. Through Bolts: Sex head type.
   2. Concealed Anchors: Stainless steel, hot dip galvanized steel, or other rust resistant, protective coated steel compatible with related materials.

2.3 PERFORMANCE

A. Surface Burning Performance: ASTM E84 Class A.
   1. Flame Spread Index: 25, maximum.
   2. Smoke Developed Index: 50, maximum.

B. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.4 MATERIALS

A. Steel Sheet:
   1. Hot-Dip Galvanized: ASTM A653/A653M, either hot dip galvanized or galvannealed.

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B. Stainless Steel Sheet: ASTM A666, Type 304.

C. Stainless Steel Castings: ASTM A743/A743M.

D. Aluminum Extrusions: ASTM B221/B221M.

2.5 FABRICATION

A. General: Fabricate compartments to sizes shown on approved Shop Drawings.

B. Door Sizes and Swings:
   1. Inswinging Doors: 24 inches wide.
   2. Outswinging Doors: 36 inches wide with 32 inch wide clear opening.

2.6 FINISHES

A. Stainless Steel Finish: No. 4 bright, directional polish or Manufacturer standard textured finish.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

B. Install units plumb, level, straight, and with tops of panels aligned.

C. Install components with following maximum clearances:
   1. Pilasters and Panels: 1/2 inch.
   2. Panels and Walls: 1 inch.

D. Brackets: Secure panels to walls and pilasters with brackets.
   1. Locate stirrup wall brackets or full height continuous bracket fasteners so holes occur at masonry or tile joints.
   2. Secure panels to walls and pilasters with brackets.

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E. Overhead Braced and Floor Anchored Units: Secure pilasters with anchors penetrating the manufacturer recommended depth into floor. Secure continuous head rail to each pilaster. Hang doors to align with tops of adjoining panels and parallel to overhead braces when closed.

F. Urinal Screens: Attach with anchoring devices to supporting structure. Secure screen to resist lateral impact.

G. Erection Tolerances:
   1. Correct Position Variation: 1/4 inch, maximum.
   2. Plumb Variation: 1/8 inch, maximum.

3.3 ADJUSTING

A. Adjust and lubricate hardware for smooth, accurate operation.

B. Set hinges on inswinging doors to hold doors open 10 degrees from closed position while unlatched. For outswinging doors, set hinges to return doors to fully closed position.

C. Touch up minor scratches and abrasions to match factory finish.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Toilet and custodial accessories.

B. Principal Products:
1. Public use toilet room accessories.
2. Custodial accessories.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate size and location of wall backing and toilet partition reinforcement for support of accessories.

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B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Each accessory type.
2. Powered Accessories: Submit electrical characteristics.
3. Initial selection color charts and Samples.

B. Schedules: List product types, quantities, sizes, and installation locations. Use room numbers and accessory numbers in schedule.

1.4 CLOSEOUT SUBMITTALS

A. Warranty Documentation: For Accessories.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 FIELD CONDITIONS

A. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 ACCESSORIES - GENERAL

A. Manufacturers and Products: See Equipment Schedule on Drawings.

2.2 PUBLIC USE TOILET ROOM ACCESSORIES

A. Accessories, General: Provide accessories of each type from single manufacturer.
   1. Accessories with Locking Panels: Tumbler cam locks; all accessories keyed alike.

2.3 CUSTODIAL ACCESSORIES

A. Mop and Broom Holders: Units with mop clips and shelf.
   1. Manufacturers and Products: See Equipment Schedule.
   2. Length: 42 inches.
   3. Mop and Broom Holders: Five, spring loaded, rubber hat, cam type.
   4. Material and Finish: 4 Stainless steel.

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2.4 PERFORMANCE

A. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

2.5 MATERIALS

A. Stainless Steel Sheet: ASTM A480, Type 304, 0.031 inch minimum nominal thickness.

B. Steel Sheet: ASTM A1008/A1008M, Designation CS; cold rolled, commercial steel, 0.036 inch minimum nominal thickness.

C. Galvanized Steel Sheet: ASTM A653/A653M, G60 hot dip zinc coating.

D. Galvanized Steel Mounting Devices: ASTM A153/A153M, hot dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices, same material as accessory.
   1. Exposed Fasteners: Tamper resistant.

F. Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

G. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.6 FABRICATION

A. Accessories, General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate sheet metal of seamless sheets with flat surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify backing supports are in place and adequate.

B. Powered Accessories: Verify electrical power is correctly located and is of proper characteristics.

3.2 INSTALLATION

A. Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

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B. Install using fasteners appropriate to substrate.

C. Grab Bars: Install to withstand 250 lbf minimum load, when tested per ASTM F446.

D. Powered Accessories: See Division 26 for wiring requirements.

E. Battery Powered Accessories: Install fresh batteries before Substantial Completion.

3.3 CLEANING AND PROTECTION

A. Clean exposed surfaces of compartments, hardware, and fittings using methods acceptable to the manufacturer.

B. Touchup, repair or replace damaged products until Substantial Completion.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Fire protection specialties.

B. Principal Products:
1. Fire extinguishers.
2. Fire extinguisher cabinets.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate Work of this section with rough openings.
2. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

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B. Preinstallation Meeting:
1. Conduct meeting one week, minimum, before starting Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data:
1. Extinguisher operational features.
2. Initial selection color Samples.
3. Show door hardware, cabinet type, trim style, and panel style.

B. Shop Drawings.
1. Show cabinet dimensions, details, fire ratings, and wall bracket mounting.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements:
1. Deliver fire protection specialties in manufacturers undamaged packaging.
2. Obtain bill of lading. Verify delivery is complete and products are undamaged.

1.6 WARRANTY

A. Manufacturer Warranty:
1. Fire Extinguishers: Warrant against product failure.
a. Failure includes material and workmanship.
b. Warranty Period: Six years.

PART 2 PRODUCTS

2.1 FIRE EXTINGUISHERS

A. Fire Extinguishers, General:
1. Fire Extinguisher Fabrication and Labeling: NFPA 10.
2. FM Global approved.

B. Multipurpose Dry Chemical:
1. Manufacturers and Products:
a. Amerex Model B441.
b. J.L. Industries Cosmic 10E.
c. Larsen's Manufacturing Company MP10.
d. Potter Roemer 3010.
2. UL Rating: 4A:80-B:C.
3. Nominal Capacity: 10 pounds.
4. Container: Enameled steel container with chrome-plated brass valve.

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2.2 FIRE EXTINGUISHER CABINETS

A. Cabinet Construction:
1. Nonrated.

B. Flush Framed Door Fire Extinguisher Cabinets:
1. Manufacturers and Products:
a. Larsen's Manufacturing Company 2409-5R as basis of design.
b. J.L. Industries.
c. Potter-Roemer.
d. Safety One Industries.
2. Type: Semi-Recessed, steel door and frame.
3. Door: Solid door of 18 gage steel, factory primed for field finishing; with pull and snap catch, no lock.
a. Hinge Pin: Stainless Steel.
4. Trim: 1-1/2 inch wide 18 gage steel, painted to match door.
5. Body: Formed, enameled 18 gage steel, hollow metal design, reinforced for flatness and rigidity. Provide fire rated tubs where cabinets are to be installed in 1-hour rated areas.
6. Glazing: Full.
7. Glass Type: Tempered.
a. Glass Color: Clear.
8. Signage: 5/8 inch high white or black. Letter color shall contrast with cabinet finish color.
a. Lettering: Vertical letters; text: "Fire Extinguisher".
9. Quantity and Location: As shown on Drawings.
10. Color: White.

2.3 PERFORMANCE

A. Fire Resistance:
1. Fire Rated Extinguisher Cabinets: ASTM E814; match rating of walls where installed.

2.4 MATERIALS

A. Steel Sheet: Cold rolled steel, ASTM A1008.

B. Aluminum Extrusions: ASTM B221.

C. Aluminum Sheet: ASTM B221, Alloy 6063-T5 minimum strength and durability.

D. Stainless Steel: ASTM A666, Type 304.

2.5 FABRICATION

A. Shop Fabrication: Provide cabinets with trim, frame, door, and hardware.

2.6 FINISHES

A. Shop Finishing Methods: Follow NAAMM AMP 500.

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2.7 ACCESSORIES

A. Mounting Brackets: Steel, red enamel finish, sized for specified fire extinguishers.

B. Fire Blankets: Fire retardant treated fabric; red color, 62 by 84 inch size.

C. Cabinet Signs: Cabinet face applied.
1. Lettering: Stenciled or Vinyl adhesive.
a. Legend: "FIRE EXTINGUISHER."
2. Arrangement: Architect selected.
3. Color: Architect selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
1. Verify rough openings and blocking for cabinets are correctly sized and located.

3.2 INSTALLATION - GENERAL

A. General: NFPA 10.

B. Secure cabinets in place to structure, square and plumb.

C. Place extinguishers and fire blankets in cabinets and on wall brackets.

D. Apply signage.

3.3 ADJUSTING

A. Adjust fire protection cabinet doors for smooth operation.

3.4 CLEANING

A. Clean interior and exterior surfaces.

B. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

C. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

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SECTION 12 24 13

ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Roller window shades.

B. Principal Products:
1. Motor operation shades.
2. Motors and controls.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate power wiring for motorized units.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Installers of electrical and control wiring.

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1.3 ACTION SUBMITTALS

A. Product Data:
1. Each roller shade type.
2. Initial selection color charts and samples for shadeband fabric and metal finish.

B. Shop Drawings: Show shades on floor plans or reflected ceiling plans.
1. Each installation area; include construction details, material descriptions, dimensions of individual components and profiles, and finishes, shadeband materials, their orientation to rollers, and their seam and batten locations.
2. Locations of control stations and units included in control zones.

C. Schedules:
1. Types by location. Include operation and appearance attributes.

D. Samples:
1. Shadeband Fabrics: 8 by 8 inch Samples of each type.
2. Fascia: 8 inch Samples in required colors.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: Shadeband materials.

B. Product Certificates: Shadeband materials testing results.

C. Qualification Statements: Installer.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include full parts list; shadeband fabric cleaning precautions.

B. Warranty documentation.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Spare Parts: Manufacturer recommended parts and quantities.

B. Extra Stock Materials:
1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than three units. Include mounting accessories.

C. Tools: Manufacturer recommended special tools required to maintain shade systems.

1.7 QUALITY ASSURANCE

A. Qualifications:
1. Installer: Manufacturer authorized or trained.

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1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements:
1. Store roller shades inside building after enclosure.
2. Mark packaging with installation location using Drawing room designations.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

1.10 WARRANTY

A. Manufacturer Warranties:
1. Warrant against product failure.
a. Hardware: Ten years.
b. Shade Fabric: 25 years.
c. Motor Operators and Controls: Five years.

PART 2 PRODUCTS

2.1 MOTOR OPERATION SHADES

A. Motorized Roller Shades: NFPA 100; listed and labeled by UL or other agency acceptable to authorities having jurisdiction.
   1. Manufacturers and Products:
      a. MechoShade Systems, Inc. ElectroShade as basis of design.
      b. Draper, Inc..
      c. Hunter Douglas Contract.
      d. Inpro WT Shade MotoRise.
      e. Lutron.
      f. SWFcontract.

B. Motor Operator: NFPA 70 compliant, UL listed.
   1. Mechoshade DC iQ3 wireless motor as basis of design.
   2. Limit Switches: Adjustable.
   3. Controls:
      a. Single Roller Stations: Momentary contact open, close, and 3 programmable intermediate stop positions.
      b. Double Roller Stations: Momentary contact open, close, and 3 programmable intermediate stop positions each for inner and outer roller shades.
      c. Timer Control: Automatic operation of solar control shades per programmable timer.
      d. Network Control: Computerized control for user selected shades in each area.

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C. Drop Position: Regular roll.

D. Mounting: See Drawings.

E. Shade Fabric Attachment: Replaceable without disassembly.

F. Hembars: Maintain bottom edges straight and flat.
   1. Style: Wrapped.

G. Accessories:
   1. Fascia: Extruded aluminum; conceals shade mounting and roller without exposed fasteners.
      a. Finish: Fabric wrapped to match shade band fabric.
   2. Ceiling Recess: Enclosure for mounting in suspended acoustical ceiling.
   3. Room Darkening Channels: Extruded aluminum with brush pile edge seals.

2.2 SHADE FABRIC

A. Shade Fabric: Color fast, impervious to heat and moisture, and able to retain shape under exposure to sunlight through windows; NFPA 701 and WCMA A100.1.
   1. Manufacturers and Products: See Finish Schedule.
   2. Mold Resistance: No Growth per ASTM G21 results for fungi ATCC9642, ATCC9644, and ATCC9645.
   3. Fire Test Response Characteristics: Passes NFPA 701 small and large scale vertical burn tests.

2.3 PERFORMANCE

A. Accessibility Requirements: Applicable provisions in Department of Justice publication 2010 ADA Standards for Accessible Design, ICC/ANSI A117.1, and state accessibility code.

B. Acoustic Performance:
   1. Motorized Units:
      a. Sound Pressure Level: 44 dBA, maximum, measured 3 feet from drive unit.
      b. No audible clicks when motor starts and stops.

C. Electrical Components:
   1. UL Listed and labeled.

2.4 FABRICATION

A. Height: Fill openings from head to within 1/2 inch of stool.

B. Width, Between Jambs: Uniform 1/4 gaps.

C. Width, Outside Mount: Lap jambs 3/4 inch.

D. Continuous Windows With Separate Rollers: Butt rollers end to end centered on window mullions.

2.5 FINISHES

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A. Powder Coating: Thermoset polyester; AAMA 2603.
   1. Color: Architect selected.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify concealed support locations for attachment.

3.2 INSTALLATION

A. Install roller shades level, aligned with adjacent units, and centered on openings.

B. Install jamb guides plumb and aligned with shadeband drop.

C. Opaque Shades: Install 2 inches minimum from window glass surface.

D. Motor Operated Units:
   1. Provide control wiring.
   2. Connect operators to power wiring.
   3. Adjust limit switches for uniform closure and intermediate stops.

E. Adjust and balance roller window shades to operate smoothly, easily, safely, and free from binding or malfunction through full operational range.

3.3 CLEANING

A. Clean metal and fabric surfaces.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller window shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.4 CLOSEOUT ACTIVITIES

A. Demonstration: Train Owner staff on operation and maintenance by a factory-authorized service representative.

END OF SECTION

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SECTION 12 36 00

COUNTERTOPS

PART 1 GENERAL

1.1 SUMMARY

A. Work Results:
1. Countertops and work surfaces.

B. Principal Products:
1. Quartz agglomerate countertops.
2. Countertop hardware.

1.2 REFERENCES

A. Definitions:
1. Sheen Levels: ASTM D523.
a. Flat: Five gloss units at 60 degrees and 10 gloss units at 85 degrees, maximum.
b. Satin: 20 to 35 gloss units at 60 degrees and 35 gloss units minimum at 85 degrees.
c. Semigloss: 35 to 70 gloss units at 60 degrees.
d. Gloss: 70 gloss units at 60 degrees, minimum.

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination Procedures:
1. Coordinate locations of utilities and accessories penetrating countertops.
2. Coordinate sizes and layouts with base cabinets.

B. Preinstallation Meeting Attendees and Procedures:
1. Conduct meeting one week, minimum, before starting Work of this Section.
2. Additional Attendees: Installers of wood blocking.

1.4 ACTION SUBMITTALS

A. Submittals, General: AWI 100.

B. Certification Labels: AWI Quality Certification Program.

C. Product Data:
1. Countertop materials.
2. Adhesives.
3. Initial selection color Samples.

D. Shop Drawings:
   1. Dimensioned plans and elevations showing countertop locations.
   2. Show materials, profiles, assembly methods, joint details, fastening methods, hardware locations, cutout sizes and locations, and finishes.

E. Samples:
   1. Countertop Material: 6 inches square.
   2. Grommets: Each type and color.

1.5 INFORMATIONAL SUBMITTALS

A. Woodworker Quality Certificates: AWI Quality Certification Program or WI Certified Compliance Program.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For stone countertops.

1.7 QUALITY ASSURANCE

A. Qualifications:
   1. Fabricator: AWI Quality Certification Program participant or WI Certified Compliance Program licensee.
   2. Installer: Woodwork fabricator.

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1.8 DELIVERY, STORAGE, AND HANDLING

A. Storage and Handling Requirements: AWI 200.

1.9 FIELD CONDITIONS

A. Ambient Conditions: Perform Work within following limitations:
   1. Building enclosed and environmental systems maintaining design conditions for Owner occupancy.

B. Existing Conditions: Verify field measurements before fabrication. Show field measurements on Shop Drawings.

PART 2 PRODUCTS

2.1 COUNTERTOP GENERAL REQUIREMENTS

A. Quality Standard: ANSI/AWI 1236 for aesthetic grades and performance.

B. Grade: Custom.

2.2 QUARTZ AGGLOMERATE COUNTERTOPS

A. Quartz Agglomerate Countertops: IFSA 3-01, manufactured quartz sheets.
   1. Grade: Custom.
   2. Manufacturers and Products: See Finish Schedule on Drawings.
   3. Configuration: See Drawings.
   4. Thickness: 2 cm.

B. Installation Materials:
   1. Adhesives: Countertop fabricator recommended, VOC compliant.
   2. Fasteners: Type, size, and material to suit each application.

2.3 COUNTERTOP HARDWARE

A. Grommets: Plastic spring loaded cover and outer ring.
   1. Color: Architect selected.

B. Countertop Supports: Extruded aluminum Concealed T brackets, L shaped configuration.
   1. Manufacturers and Products:
      a. Rakks.
   2. Finish: Powder coat.
      a. Color: Architect selected.

C. Countertop Supports: Steel Concealed T brackets, L shaped configuration.
   1. Manufacturers and Products:
      a. A&M Hardware.
   2. Finish: Powder coat.
      a. Color: Architect selected.

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2.4 MATERIALS

A. Fire Retardant Treated Wood:
   1. Chemically treated and pressure impregnated.
   2. Flame Spread: 25, maximum per ASTM E84.
   3. Label or otherwise identify fire retardant treated material.
   4. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

2.5 FABRICATION

A. Shop assemble Work for delivery to site, permitting passage through building openings.

B. Joints: Fabricate countertops without joints.

C. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
   1. Fabricate with loose backsplashes for field assembly.

D. When necessary to cut and fit on site, fabricate materials with ample allowance for cutting. Furnish trim for scribing and site cutting.

E. Fabrication Tolerances:
   1. Wood Based and Solid Surface Countertops: ANSI/AWI 0620, specified grade.

F. Finish exposed edges of countertops and back and end splashes.

G. Stone and Quartz Agglomerate Countertop Fabrication:
   1. Natural Stone Institute Dimension Stone Design Manual.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adequacy of countertop supporting blocking, base cabinets, and brackets.

B. Verify utility rough-in locations and sizes.

3.2 PREPARATION

A. Surface Preparation: Follow ANSI/AWI 0620.

B. Conditioning:
   1. Acclimate products to installation environment per AWI 200 and ANSI/AWI 0620.

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3.3 INSTALLATION

A. Follow ANSI/AWI 0620.

B. Installation Grade: Custom.

C. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent unit.

D. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

E. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

F. Cut openings for plumbing fixtures, electrical devices, and accessories.

G. Install countertop fasteners in concealed locations.

H. Align edge surfaces. Support to prevent deflection and lippage.

I. Interface with Adjacent Work: Seal gaps between tops, splashes, and walls with mildew resistant sealant specified in Section 079200.

J. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
   1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

3.4 FIELD QUALITY CONTROL

A. Field inspection by Architect.

B. Non Conforming Work: Remove and replace, and retest.

3.5 CLEANING

A. Clean countertops and splashes; remove excess sealant from adjacent surfaces.

B. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where not possible to repair, replace countertops. Adjust joinery for uniform appearance.

3.6 PROTECTION

A. Protect countertops from soil and damage during remainder of construction.

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END OF SECTION

SECTION 21 05 17 - SLEEVES AND SLEEVE SEALS FOR FIRE-SUPPRESSION PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Sleeves.
   2. Grout.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

B. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

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2.2 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Metraflex Company (The).
   2. Pipeline Seal and Insulator, Inc.
   3. Proco Products, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
   1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
   2. Pressure Plates: Carbon steel.

C. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
   1. Sleeves are not required for core-drilled holes.
C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.
   1. Cut sleeves to length for mounting flush with both surfaces.
      a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level.
   2. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.
D. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:
   1. Exterior Concrete Walls above Grade:
      a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.
      b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.
   2. Exterior Concrete Walls below Grade:
      a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system.
         1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
      b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.
         1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
   3. Concrete Slabs-on-Grade:
      a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves with sleeve-seal system.
         1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
      b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves with sleeve-seal system.
         1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.
   4. Concrete Slabs above Grade:
      a. Piping Smaller Than NPS 6 : Galvanized-steel-pipe sleeves.
      b. Piping NPS 6 and Larger: Galvanized-steel-pipe sleeves.

END OF SECTION 21 05 17

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SECTION 21 05 53 - IDENTIFICATION FOR FIRE-SUPPRESSION PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Equipment labels.
   2. Warning signs and labels.
   3. Pipe labels.
   4. Stencils.
   5. Valve tags.
   6. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Samples: For color, letter style, and graphic representation required for each identification material and device.
C. Equipment-Label Schedule: Include a listing of all equipment to be labeled and the proposed content for each label.
D. Valve Schedules: Valve numbering scheme.

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1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each piping system to include in maintenance manuals.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Metal Labels for Equipment:
   1. Material and Thickness: Brass, 0.032 inch thick, with predrilled holes for attachment hardware.
   2. Letter Color: Black.
   3. Background Color: Red.
   4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
   5. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   6. Fasteners: Stainless-steel rivets.

7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), and the Specification Section number and title where equipment is specified.

C. Equipment-Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules) and the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe-Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings; pipe size; and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping-system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

E. Pipe-Label Colors:

1. Background Color: Red.
2. Letter Color: White.

2.3 VALVE TAGS

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A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping-system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032 inch thick, with predrilled holes for attachment hardware.
2. Fasteners: Brass wire-link chain.
3. Valve-Tag Color: Red.
4. Letter Color: White.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 LABEL INSTALLATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install or permanently fasten labels on each major item of mechanical equipment.
D. Locate equipment labels where accessible and visible.
E. Piping Color-Coding: Painting of piping is specified in Section 099123 "Interior Painting."
   1. Identification Paint: Use for contrasting background.
   2. Stencil Paint: Use for pipe marking.
F. Pipe-Label Locations: Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
   1. Near each valve and control device.
   2. Near each branch connection excluding short takeoffs. Where flow pattern is not obvious, mark each pipe at branch.
   3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
   4. At access doors, manholes, and similar access points that permit view of concealed piping.
   5. Near major equipment items and other points of origination and termination.
   6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

3.3 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems. List tagged valves in a valve-tag schedule.
B. Valve-Tag Application Schedule: Tag valves according to size, shape, and with captions similar to those indicated in "Valve-Tag Size and Shape" Subparagraph below:
   1. Valve-Tag Size and Shape:
      a. Fire-Suppression Standpipe: 1-1/2 inches, round.
      b. Wet-Pipe Sprinkler System: 1-1/2 inches, round.

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3.4 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 21 05 53

SECTION 21 13 13 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Pipes, fittings, and specialties.
   2. Fire-protection valves.
   3. Sprinklers.
   4. Alarm devices.
   5. Pressure gages.

B. Related Sections:
   1. Section 211200 "Fire-Suppression Standpipes" for standpipe piping.

1.3 DEFINITIONS

A. High-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure higher than standard 175 psig, but not higher than 250 psig.

B. Standard-Pressure Sprinkler Piping: Wet-pipe sprinkler system piping designed to operate at working pressure of 175 psig maximum.

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1.4 SYSTEM DESCRIPTIONS

A. The Contractor shall be responsible for the Automatic Fire Sprinkler inside of the building within five feet (5') of the foundation, and within the building itself. See Civil Engineer's plans for onsite Fire system. This specification is intended to establish the required performance and quality of the work necessary to provide for a complete automatic sprinkler system above and below ceiling to serve the buildings on site as indicated on the drawings.

1.5 PERFORMANCE REQUIREMENTS

A. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.

B. Sprinkler system design shall be approved by authorities having jurisdiction.
   1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
   2. Sprinkler Occupancy Hazard Classifications:
      a. Building Service Areas: Ordinary Hazard, Group 1.
      b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
      c. General Storage Areas: Ordinary Hazard, Group 1.
      d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
      e. Office and Public Areas: Light Hazard.
   3. Minimum Density for Automatic-Sprinkler Piping Design:
      a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq. ft. area.
      b. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
   4. Maximum Protection Area per Sprinkler: Per UL listing.

5. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:
   a. Light-Hazard Occupancies: 100 gpm for 30 minutes.
   b. Ordinary-Hazard Occupancies: 250 gpm for 60 to 90 minutes.

C. Seismic Performance: Sprinkler piping shall withstand the effects of earthquake motions determined according to NFPA 13 and ASCE/SEI 7.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For wet-pipe sprinkler systems. Include plans, elevations, sections, details, and attachments to other work.
   1. Wiring Diagrams: For power, signal, and control wiring.

C. Delegated-Design Submittal: For sprinkler systems indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

D. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations if applicable.

E. Fire-hydrant flow test report.

F. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
      a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

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B. Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. NFPA Standards: Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
   1. NFPA 13, "Installation of Sprinkler Systems."

1.8 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.

2.2 STEEL PIPE AND FITTINGS

A. Standard Weight, Galvanized- and Black-Steel Pipe: ASTM A 53/A 53M, Type E, Grade B. Pipe ends may be factory or field formed to match joining method.
B. Schedule 30, Galvanized- and Black-Steel Pipe: ASTM A 135; ASTM A 795/A 795M, Type E; or ASME B36.10M, wrought steel; with wall thickness not less than Schedule 30 and not more than Schedule 40. Pipe ends may be factory or field formed to match joining method.
C. Nonstandard OD, Thinwall Black-Steel Pipe: ASTM A 135 or ASTM A 795/A 795M, thinwall, with plain ends and wall thickness less than Schedule 10.
D. Galvanized- and Black-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
E. Galvanized and Uncoated, Steel Couplings: ASTM A 865, threaded.
F. Galvanized and Uncoated, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
G. Malleable- or Ductile-Iron Unions: UL 860.
H. Cast-Iron Flanges: ASME 16.1, Class 125.
I. Steel Flanges and Flanged Fittings: ASME B16.5, Class 150.
J. Steel Welding Fittings: ASTM A 234/A 234M and ASME B16.9.
K. Grooved-Joint, Steel-Pipe Appurtenances:
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        a. Anvil International, Inc.
        b. Tyco Fire & Building Products LP.
        c. Victaulic Company.
    2. Pressure Rating: 175 psig minimum.
    3. Galvanized and Uncoated, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting; with dimensions matching steel pipe.
    4. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213, rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.
L. Steel Pressure-Seal Fittings: UL 213, FM-approved, 175-psig pressure rating with steel housing, rubber O-rings, and pipe stop; for use with fitting manufacturers' pressure-seal tools.
    1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
        a. Victaulic Company.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free.
    1. Class 125, Cast-Iron Flanges and Class 150, Bronze Flat-Face Flanges: Full-face gaskets.
    2. Class 250, Cast-Iron Flanges and Class 300, Steel Raised-Face Flanges: Ring-type gaskets.
B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

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C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 LISTED FIRE-PROTECTION VALVES

A. General Requirements:
1. Valves shall be UL listed or FM approved.
2. Minimum Pressure Rating for Standard-Pressure Piping: 175 psig.
3. Minimum Pressure Rating for High-Pressure Piping: 250 psig.

B. Ball Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Anvil International, Inc.
b. Victaulic Company.
2. Standard: UL 1091 except with ball instead of disc.
3. Valves NPS 1-1/2 and Smaller: Bronze body with threaded ends.
4. Valves NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
5. Valves NPS 3: Ductile-iron body with grooved ends.

C. Check Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Anvil International, Inc.
b. NIBCO INC.
c. Tyco Fire & Building Products LP.
d. Victaulic Company.
2. Standard: UL 312.
3. Pressure Rating: 250 psig minimum.
4. Type: Swing check.
5. Body Material: Cast iron.
6. End Connections: Flanged or grooved.

D. Indicating-Type Butterfly Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Anvil International, Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.
2. Standard: UL 1091.
3. Pressure Rating: 175 psig minimum.
4. Valves NPS 2 and Smaller:
a. Valve Type: Ball or butterfly.
b. Body Material: Bronze.
c. End Connections: Threaded.
5. Valves NPS 2-1/2 and Larger:
a. Valve Type: Butterfly.
b. Body Material: Cast or ductile iron.
c. End Connections: Flanged, grooved, or wafer.
6. Valve Operation: Integral electrical, 115-V ac, prewired, single-circuit, supervisory switch visual indicating device.

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2.5 TRIM AND DRAIN VALVES

A. General Requirements:
1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating: 175 psig minimum.

B. Angle Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Fire Protection Products, Inc.
b. United Brass Works, Inc.

C. Ball Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Anvil International, Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.

D. Globe Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Fire Protection Products, Inc.
b. United Brass Works, Inc.

E. Plug Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Southern Manufacturing Group.

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2.6 SPECIALTY VALVES

A. General Requirements:
1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating:
a. Standard-Pressure Piping Specialty Valves: 175 psig minimum.
b. High-Pressure Piping Specialty Valves: 250 psig minimum.
3. Body Material: Cast or ductile iron.
4. Size: Same as connected piping.
5. End Connections: Flanged or grooved.

B. Alarm Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Reliable Automatic Sprinkler Co., Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.
2. Standard: UL 193.
3. Design: For horizontal or vertical installation.
4. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages and fill-line attachment with strainer.

2.7 SPRINKLER SPECIALTY PIPE FITTINGS

A. Flow Detection and Test Assemblies:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Reliable Automatic Sprinkler Co., Inc.
b. Tyco Fire & Building Products LP.
c. Victaulic Company.

2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig minimum.
4. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

B. Sprinkler Inspector's Test Fittings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Tyco Fire & Building Products LP.
b. Victaulic Company.
c. Viking Corporation.
2. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
3. Pressure Rating: 175 psig minimum.
4. Body Material: Cast- or ductile-iron housing with sight glass.
5. Size: Same as connected piping.
6. Inlet and Outlet: Threaded.

2.8 SPRINKLERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
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1. Reliable Automatic Sprinkler Co., Inc.
2. Tyco Fire & Building Products LP.
3. Victaulic Company.

B. General Requirements:
1. Standard: UL's "Fire Protection Equipment Directory" listing or "Approval Guide," published by FM Global, listing.
2. Pressure Rating for Automatic Sprinklers: 175 psig minimum.

C. Automatic Sprinklers with Heat-Responsive Element:
1. Early-Suppression, Fast-Response Applications: UL 1767.
2. Nonresidential Applications: UL 199.
3. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.

D. Sprinkler Finishes:
1. Color and finish of all corrosion-resistant sprinklers shall be as approved by Architect.

E. Water-Flow Indicators:
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
a. Potter Electric Signal Company.
2. Standard: UL 346.
3. Water-Flow Detector: Electrically supervised.
4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

5. Type: Paddle operated.
6. Pressure Rating: 250 psig.
7. Design Installation: Horizontal or vertical.

F. Valve Supervisory Switches:
1. Manufacturers: Subject to compliance with requirements, provide products by the following:
a. Potter Electric Signal Company.
2. Standard: UL 346.
3. Type: Electrically supervised.
4. Components: Single-pole, double-throw switch with normally closed contacts.
5. Design: Signals that controlled valve is in other than fully open position.

2.9 Sprinkler Heads:

A. Interior Finished Ceilings and Exterior Soffits:
1. Heads shall be Reliable Model F1FR quick response sprinkler, recessed standard spray pendent with bright chrome finish. Pendent heads shall be Reliable Model F1FR quick response sprinkler, standard spray pendent with bright chrome finish. Escutcheons shall be Model F2. Equivalent products of Viking or Tyco are acceptable. Corrosion-resistant finish shall be installed at exterior areas; finish shall be polyester or Teflon coating with matching escutcheon. Color and finish of all corrosion-resistant sprinklers shall be as approved by Architect.
2. All areas without Suspended Ceilings, Concealed Areas, Unfinished Ceilings and Storage Areas: Heads shall be Reliable, model F1FR quick response sprinkler upright/pendent with rough brass finish. Equivalent products of Viking or Tyco are acceptable. Where required, escutcheons shall be Sweet and Donaldson #401 with chrome finish at storage, mechanical, and electrical room ceilings.
3. Concealed Areas: Heads shall be Reliable, model F1FR quick response sprinkler upright/pendent with rough brass finish. Equivalent products of Viking or Tyco are acceptable. Where required, escutcheons shall be Sweet and Donaldson #401 with chrome finish at storage, mechanical, and electrical room ceilings.
4. Sidewall Sprinklers: Sidewall sprinklers Reliable Model F1FR quick response sprinkler, and may be installed for interior and exterior applications, subject to prior approval by Architect. Heads shall be Reliable Model F1FR quick response sprinkler horizontal, with bright chrome finish. Equivalent products of Viking or Tyco are acceptable.
5. Temperature Ratings: Heads below finished ceilings, and in all other occupied areas shall have a temperature rating of Ordinary (155-165 degrees). Heads in unventilated, concealed and void spaces shall have a temperature rating of Intermediate (200-212 degrees), unless otherwise required by code.
6. Provide metal cabinet for a reserve supply of sprinkler heads, as required by N.F.P.A. 13. Include suitable head wrenches for each type of sprinkler installed. Stock shall include all types and temperature ratings installed. Locate as directed by Architect.

B. Special Coatings:
1. Wax.
2. Lead.
3. Corrosion-resistant paint.

C. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
1. Ceiling Mounting: Chrome-plated steel, two piece, with 1-inch vertical adjustment.
2. Sidewall Mounting: Chrome-plated steel, one piece, flat.

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D. Water-Flow Indicators:
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. Potter Electric Signal Company.
   2. Standard: UL 346.
   3. Water-Flow Detector: Electrically supervised.
   4. Components: Two single-pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.
   5. Type: Paddle operated.
   6. Pressure Rating: 250 psig.
   7. Design Installation: Horizontal or vertical.

E. Valve Supervisory Switches:
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. Potter Electric Signal Company.
   2. Standard: UL 346.
   3. Type: Electrically supervised.
   4. Components: Single-pole, double-throw switch with normally closed contacts.
   5. Design: Signals that controlled valve is in other than fully open position.

2.10 PRESSURE GAGES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. AMETEK; U.S. Gauge Division.
   2. Ashcroft, Inc.
   3. Brecco Corporation.
   4. WIKA Instrument Corporation.

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B. Standard: UL 393.
C. Dial Size: 3-1/2- to 4-1/2-inch diameter.
D. Pressure Gage Range: 0 to 250 psig minimum.
E. Water System Piping Gage: Include "WATER" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system design calculations required in "Quality Assurance" Article.
B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements for exterior piping in Section 211100 "Facility Fire-Suppression Water-Service Piping."
B. Install shutoff valve, backflow preventer, pressure gage, drain, and other accessories indicated at connection to water-service piping. Comply with requirements for backflow preventers in Section 211100 "Facility Fire-Suppression Water-Service Piping."

3.3 WATER-SUPPLY CONNECTIONS

A. Connect sprinkler piping to building's interior water-distribution piping. Comply with requirements for interior piping in Section 221116 "Domestic Water Piping."
B. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.4 PIPING INSTALLATION

A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
   1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.
B. Piping Standard: Comply with requirements for installation of sprinkler piping in NFPA 13.
C. Install seismic restraints on piping. Comply with requirements for seismic-restraint device materials and installation in NFPA 13.
D. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
E. Install unions adjacent to each valve in pipes NPS 2 and smaller.
F. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
G. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
H. Install sprinkler piping with drains for complete system drainage.
I. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
J. Install alarm devices in piping systems.
K. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements for hanger materials in NFPA 13.
L. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.
M. Fill sprinkler system piping with water.
N. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
O. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
P. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

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3.5 JOINT CONSTRUCTION

A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.

G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
   1. Apply appropriate tape or thread compound to external pipe threads.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

H. Twist-Locked Joints: Insert plain end of steel pipe into plain-end-pipe fitting. Rotate retainer lugs one-quarter turn or tighten retainer pin.

I. Steel-Piping, Pressure-Sealed Joints: Join lightwall steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.

J. Welded Joints: Construct joints according to AWS D10.12M/D10.12, using qualified processes and welding operators according to "Quality Assurance" Article.
   1. Shop weld pipe joints where welded piping is indicated. Do not use welded joints for galvanized-steel pipe.

K. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.

L. Steel-Piping, Roll-Grooved Joints: Roll rounded-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.

M. Steel-Piping, Pressure-Sealed Joints: Join Schedule 5 steel pipe and steel pressure-seal fittings with tools recommended by fitting manufacturer.

N. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

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3.6 VALVE AND SPECIALTIES INSTALLATION

A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.

D. Specialty Valves:
   1. General Requirements: Install in vertical position for proper direction of flow, in main supply to system.
   2. Alarm Valves: Include bypass check valve and retarding chamber drain-line connection.

3.7 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of narrow dimension of acoustical ceiling panels.

3.8 IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.9 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
4. Energize circuits to electrical equipment and devices.
5. Coordinate with fire-alarm tests. Operate as required.

C. Sprinkler piping system will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

3.10 CLEANING

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint other than factory finish.

3.11 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

3.12 PIPING SCHEDULE

A. Piping between Fire-Department Connections and Check Valves: Galvanized, standard-weight steel pipe with threaded ends; cast-iron threaded fittings; and threaded joints.

B. Sprinkler specialty fittings may be used downstream of control valves, instead of specified fittings.

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C. Standard-pressure, wet-pipe sprinkler system, NPS 1 and smaller, shall be the following:

1. Standard-weight, black-steel pipe with threaded ends; uncoated, gray-iron threaded fittings; and threaded joints.

D. Standard-pressure, wet-pipe sprinkler system, NPS 1-1/4 to NPS 4, shall be one of the following:

1. Standard-weight, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
2. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.
3. Thinwall Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

E. Standard-pressure, wet-pipe sprinkler system, NPS 5 and larger, shall be one of the following:

1. Standard-weight, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
2. Standard-weight, black-steel pipe with plain ends; steel welding fittings; and welded joints.
3. Thinwall Schedule 10, black-steel pipe with roll-grooved ends; uncoated, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
4. Thinwall Schedule 10, black-steel pipe with plain ends; welding fittings; and welded joints.

3.13 SPRINKLER SCHEDULE

A. Use sprinkler types in subparagraphs below for the following applications:

1. Fire Station: Quick response concealed sprinklers.

B. Provide sprinkler types in subparagraphs below with finishes indicated.
   1. Concealed Sprinklers: Color and finish of all corrosion-resistant sprinklers shall be as approved by Architect.

END OF SECTION 21 13 13

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SECTION 22 05 17 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Sleeves.
2. Sleeve-seal systems.
3. Grout.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions

surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

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1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

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1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.

d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

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1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled “SPECIFIED ITEM, NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor’s responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were

selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.

5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.12 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

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1.13 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 SLEEVES: Shall be plastic or galvanized steel where pipes pass through concrete walls or floor slabs.

A. Isolate pipes through ground floor slabs with Kraft paper, plastic tape or similar materials unless conduit is specified or indicated.

B. Sleeves for pipes through exterior walls shall be non-metallic with minimum 2" weep ring as manufactured by Link Seal. Pipe shall be sealed with Link Seal modular seal with EPDM seal elements.

C. Sleeves in or through fire rated walls shall be per U.L. Fire Resistance System No. WL1146 for drywall construction, and U.L. Fire Resistance System No. CAJ1044 for concrete construction. See architectural plans for all locations of rated walls.

D. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.

E. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.

F. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.

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2.2 SLEEVE-SEAL SYSTEMS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Advance Products & Systems, Inc.
2. Metraflex Company (The).
3. Pipeline Seal and Insulator, Inc.

B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.

1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Stainless steel.
3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION

A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.

B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.

1. Sleeves are not required for core-drilled holes.

C. Install sleeves in concrete floors, concrete roof slabs, and concrete walls as new slabs and walls are constructed.

1. Permanent sleeves are not required for holes in slabs formed by molded-PE or -PP sleeves.
2. Cut sleeves to length for mounting flush with both surfaces.
3. Using grout, seal the space outside of sleeves in slabs and walls without sleeve-seal system.

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D. Install sleeves for pipes passing through interior partitions.

1. Cut sleeves to length for mounting flush with both surfaces.
2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint. Comply with requirements for sealants specified in Section 079200 "Joint Sealants."

E. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements for firestopping specified in Section 078413 "Penetration Firestopping."

3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.

B. Select type, size, and number of sealing elements required for piping material and size and for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and

sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

3.3 SLEEVE AND SLEEVE-SEAL SCHEDULE

A. Use sleeves and sleeve seals for the following piping-penetration applications:

1. Exterior Concrete Walls below Grade:

   a. Piping Smaller Than NPS 6: Galvanized-steel wall sleeves with sleeve-seal system.

      1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

2. Concrete Slabs-on-Grade:

   a. Piping Smaller Than NPS 6: Galvanized-steel wall sleeves with sleeve-seal system.

      1) Select sleeve size to allow for 1-inch annular clear space between piping and sleeve for installing sleeve-seal system.

3. Concrete Slabs above Grade:

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   a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.

4. Interior Partitions:

   a. Piping Smaller Than NPS 6: Galvanized-steel-pipe sleeves.

END OF SECTION 22 05 17

SECTION 22 05 18 - ESCUTCHEONS FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Escutcheons.
2. Floor plates.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions

surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

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1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

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1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.

d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

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1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled “SPECIFIED ITEM, NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor’s responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were

selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.

5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.12 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

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1.13 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

A. One-Piece, Cast-Brass Type: With polished, chrome-plated and rough-brass finish and setscrew fastener.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with chrome-plated finish and spring-clip fasteners.

2.2 FLOOR PLATES

A. One-Piece Floor Plates: Cast-iron flange with holes for fasteners.

B. Split-Casting Floor Plates: Cast brass with concealed hinge.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install escutcheons for piping penetrations of walls, ceilings, and finished floors.

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B. Install escutcheons with ID to closely fit around pipe, tube, and insulation of insulated piping and with OD that completely covers opening.

1. Escutcheons for New Piping:

a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
b. Chrome-Plated Piping: One-piece, cast-brass type with polished, chrome-plated finish.
c. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
d. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished, chrome-plated finish.
e. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished, chrome-plated or rough-brass finish.
f. Bare Piping in Equipment Rooms: One-piece, cast-brass type with polished, chrome-plated or rough-brass finish.

C. Install floor plates for piping penetrations of equipment-room floors.

D. Install floor plates with ID to closely fit around pipe, tube, and insulation of piping and with OD that completely covers opening.

1. New Piping: One-piece, floor-plate type.
2. Existing Piping: Split-casting, floor-plate type.

3.2 FIELD QUALITY CONTROL

A. Replace broken and damaged escutcheons and floor plates using new materials.

END OF SECTION 22 05 18

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SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Bronze ball valves.
2. Ductile-iron, single-flange butterfly valves.
3. Bronze lift check valves.
4. Bronze swing check valves.
5. Bronze gate valves.
6. Iron gate valves
7. Manual circuit balancing valves.
8. Gas shut-off cocks.
9. LPG shut-off cocks.

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B. Related Sections:

1. Division 2 water distribution piping Sections for general-duty and specialty valves for site construction piping.
2. Division 15 plumbing piping Sections for specialty valves applicable to those Sections only.
3. Division 15 Section "Identification for Plumbing Piping and Equipment" for valve tags and schedules.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene diene terpolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. OS&Y: Outside screw and yoke.

F. RS: Rising stem.

G. SWP: Steam working pressure.

1.4 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.5 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2019 CPC).
2. 2019 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

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1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.9 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

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B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.10 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.11 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

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a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
c. Include all pertinent construction, installation, performance and technical data.
d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of

the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

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1.12 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:

1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.1 for power piping valves.
3. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61-G and NSF-372 for valve materials for potable-water service.

1. Valves for domestic water must comply with the Federal Reduction of Lead in Drinking Water Act.
   a. "Lead Free" refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25%.
   b. All valves must be 3rd party certified.
   c. Bronze valves shall be made of dezincification-resistant material.

1.13 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:

1. Protect internal parts against rust and corrosion.
2. Protect threads, flange faces, grooves, and weld ends.
3. Set angle, gate, and globe valves closed to prevent rattling.
4. Set ball and plug valves open to minimize exposure of functional surfaces.
5. Set butterfly valves closed or slightly open.
6. Block check valves in either closed or open position.

B. Use the following precautions during storage:

1. Maintain valve end protection.
2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

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1.14 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.15 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.16 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Piping systems shall be supplied with valves arranged so as to give complete and regulating control of each building and piping systems throughout the building, and located so all parts are easily accessible and maintained.

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1. Valve Design: Rising stem or outside screw and yoke stems. Non-rising stem valves may be used where space conditions prevent full extension of rising stems.
2. Sizes: Same size as upstream pipe, unless otherwise indicated.
3. Extended stems: Where piping insulation is indicated or specified, valves shall be equipped with 2” extended handles of non-thermal conductive material. Also provide a protective sleeve that allows operation of the valve without breaking the vapor seal or disturbing the insulation. Supply with memory stops, which are fully adjustable after insulation is applied.
4. End Connection: 2 inch and under shall be threaded, 2-1/2 inches and larger shall be flanged or full lug style.

C. Valves for Potable Water must comply with California Lead Free Law, effective January 1, 2010.

1. “Lead Free” refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25%. Source: California Health & Safety Code (116875).
2. All valves must be 3rd party certified.
3. Bronze valves shall be made with dezincification-resistant material.

D. Where possible, valves of one manufacturer shall be used.

E. Provide Class 150 valves meeting the valve specifications where Class 125 valves are specified but are not available.

F. Bronze valves shall be made with dezincification-resistant materials, (Bronze ASTM B62, B61, or B584 Alloy C87850). This includes body, ball, stem and / or trim.

G. Bronze Valves: NPS 2 and smaller with threaded ends, unless otherwise indicated.

H. Ferrous Valves: NPS 2-1/2 and larger with flanged ends, unless otherwise indicated.

I. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

J. Valve Sizes: Same as upstream piping unless otherwise indicated.

K. Valve Actuator Types:

1. Hand-wheel: For valves other than quarter-turn types.
2. Hand-lever: For quarter-turn valves NPS 6 and smaller.

L. Valves in Insulated Piping: With 2-inch stem extensions and the following features:

1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation and memory stops that are fully adjustable after insulation is applied.

a. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Nib-seal handle extension or comparable product by one of the following:

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b. General valves:

1) NIBCO
2) Hammond
3) Milwaukee

c. Below grade domestic water shut-off valves (gate valves) 2” and larger:

1) NIBCO.
2) Clow.
3) Mueller.

d. Butterfly Valves:

1) NIBCO.
2) Demco.
3) Dezuric.

e. Plug Valves:

1) Hammond.
2) Milwaukee.

f. Check valves, lift type:

1) Hammond.

2) Milwaukee.

g. Below grade backwater valve isolation valves:

1) NIBCO.
2) Clow.
3) Mueller.

2. Butterfly Valves: With extended neck.

M. Valve-End Connections:

1. Flanged: With flanges according to ASME B16.1 for iron valves, ASME B16.5 for steel valves.
2. Grooved: With grooves according to AWWA C606.
3. Solder Joint: With sockets according to ASME B16.18.
4. Threaded: With threads according to ASME B1.20.1.

N. Valve Bypass and Drain Connections: MSS SP-45.

2.2 BRONZE BALL VALVES

A. Three-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim & Nib-Seal Handle:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-595-Y-66-LF or T-595-Y-66-LF or a comparable product by one of the following,

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a. Milwaukee Valve Company.
b. Apollo.

2. Description:

c. Standard: MSS SP-110, NSF 61-G.
d. CWP Rating: 600 psig.
e. Body Design: Three piece with threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing.
f. Body Material: Bronze ASTM B 584 Alloy C87850 or C87600.
g. Ends: Threaded or Solder.
h. Seats: PTFE or TFE.
i. Stem: 316 Stainless steel.
j. Ball: 316 Stainless steel, vented.
k. Port: Full.

B. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim & Nib-Seal Handle:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-585-66-LF or T-585-66-LF or a comparable product by one of the following:

a. Conbraco Industries, Inc.; Apollo Div.
b. Milwaukee Valve Company.

2. Description:

a. Standard: MSS SP-110, NSF 61-G.
b. CWP Rating: 600 psig.
c. Body Design: Two piece with threaded body packnut design (no threaded stem designs allowed) with adjustable stem packing.
d. Body Material: Bronze ASTM B 584 Alloy C87600.
e. Ends: Threaded or Solder.
f. Seats: PTFE or TFE.
g. Stem: 316 Stainless steel.
h. Ball: 316 Stainless steel, vented.
i. Port: Full.

C. 200 CWP, Sizes 2-1/2" – 24", Ductile Iron, Single-Flange Butterfly Valves with EPDM Seat and Aluminum-Bronze Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model LD-2000-3/5, or a comparable product by one of the following:

a. Cooper Cameron Corp.; Cooper Cameron Valves Div.
b. Tyco International, Ltd.; Tyco Valves & Controls

2. Description:

a. Standard: MSS SP-67, Type I, IAPMO.
b. NPS 24 (DN 300) and Smaller CWP Rating: 200 psig (1380 kPa).
c. Body Design: Full Lug type; Bubble tight shutoff, suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
d. Body Material: ASTM A 536, ductile iron.
e. Seat: EPDM.
f. Stem: One- or two-piece stainless steel.
g. Disc: Aluminum bronze

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D. Retain one or more of six paragraphs in this article if iron, single-flange butterfly valves are required. MSS SP-67 covers iron, single-flange butterfly valves NPS 1-1/2 to NPS 72.

2.3 BRONZE LIFT CHECK VALVES

A. Class 125, Lift Check Valves with Nonmetallic TFE Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-480-Y-LF or T-480-Y-LF or a comparable product by one of the following:

a. Hammond.
b. Milwaukee.

2. Description:

a. Standard: MSS SP-80, Type 2, NSF 61-G.
b. CWP Rating: 200 psig.
c. Body Design: Vertical flow.

d. Body Material: ASTM B 584 Alloy C87850, lead free bronze.
e. Ends: Threaded or Solder.
f. Disc: PTFE, or TFE.

2.4 BRONZE SWING CHECK VALVES

A. Class 125, Bronze Swing Check Valves with Nonmetallic TFE Disc:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-413-Y-LF or T-413-Y-LF or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:

a. Standard: MSS SP-80, Type 4, NSF 61-G.
b. CWP Rating: 200 psig.
c. Body Design: Y-pattern Horizontal flow.
d. Body Material: ASTM B 584 Alloy C87850, lead free bronze.
e. Ends: Threaded or Solder.
f. Disc: PTFE or TFE.

2.5 BRONZE GATE VALVES

A. NRS Bronze Gate Valves:

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1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-113-LF or T-113-LF or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves.

2. Description:

a. Standard: MSS SP-139, Type 2, NSF 61-G.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B 584, dezincification-resistant bronze with integral seat and threaded bonnet.
d. Ends: Threaded or Solder.
e. Stem: Lead free Silicon Bronze.
f. Disc: Solid wedge; lead free bronze.
g. Packing: Asbestos free.
h. Handwheel: Malleable iron.

B. RS Bronze Gate Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model S-111-LF or T-111-LF or a comparable product by one of the following:

a. Crane Co.; Crane Valve Group; Crane Valves.
b. Powell Valves

2. Description:
a. Standard: MSS SP-80, Type 2, NSF 61-G.
b. CWP Rating: 200 psig.
c. Body Material: ASTM B584 C87850 dezincification resistant bronze with integral seat and threaded bonnet.
d. Ends: Threaded or Solder.
e. Stem: Lead free silicon bronze.
f. Disc: Solid wedge, lead free bronze.
g. Packing: Asbestos free.
h. Handwhell: Malleable iron.

2.6 IRON GATE VALVES

A. Class 125, Ductile-Iron Resilient Wedge Gate Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F-619-RWS (NRS) or F-607-RWS (OS&Y) or a comparable product by one of the following:

a. Clow
b. Mueller

2. Description:

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a. Standard: AWWA C-509 and C-515,
b. CWP Rating: 300 psig.
c. Body Material: ASTM A536 ductile iron, fusion-bonded epoxy coating inside and out.
d. Ends: Flanged.
e. Trim: stainless steel.
f. Disc: Rubber encapsulated ductile iron wedge.
g. Packing and Gasket: Asbestos free.

2.7 MANUAL CIRCUIT BALANCING VALVES

A. Bronze, Fixed Orifice, Balancing Valves (2” and smaller):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model T/S-1810-LF or a comparable product by one of the following:

a. Or approved equal

2. Description:

a. CWP Rating: 300 psig
b. Maximum Operating Temperature: 260°F.

c. Body Material: Bronze or dezincification-resistant brass, lead free, Y-pattern globe type with fixed orifice (venture) for precise regulation and control. NO QUARTER TURN VALVES WILL BE ACCEPTED.
d. Plug: Bronze or dezincification-resistant brass with EPDM O-Rings.
e. Seat: Bronze or dezincification-resistant brass.
f. Ends: Threaded or Solder.
g. Pressure Gage Connections: Shall have two metering test ports with internal check and protective caps for use with portable differential pressure metering stations.
h. Handle Style: Calibrated hand wheel equipped with visual position readout and hidden memory stops for repeatable regulation and control.

B. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves (2-1/2" and larger):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model F/G 737A or a comparable product by one of the following:

a. Tour & Andersson

2. Description:

a. CWP Rating: 240 psig
b. Maximum Operating Temperature: 250°F.
c. Body Material: Cast-iron or steel body, globe pattern with calibrated orifice. NO BUTTERFLY VALVES.
d. Stem Seals: EPDM O-Rings.
e. Disc: EPDM coated cast-iron disc.
f. Seat: Bronze or dezincification brass.
g. Ends: Flanged or grooved.
h. Pressure Gage Connection: Integral seals for portable differential pressure meter.
i. Handle Style: Calibrated hand wheel equipped with visual position readout and concealed memory stops for repeatable regulation and control.

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2.8 GAS SHUT-OFF COCKS:

A. Gas Shut-Off Cocks, Above Grade (4" and smaller):

1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model T-FP-600-A or a comparable product by one of the following:

a. Or approved equal.

2. Description:

a. Standard: MSS SP-110
b. CWP Rating: 600 psig.
c. SWP Rating: 150 psig.
d. Gas Rating: CSA certified and UL/FM listed.

e. Body Design: Two piece with threaded body pack nut design (no threaded stem designs al-lowed) with adjustable stem packing.
f. Body Material: Dezincification-resistant brass.
g. Seats: PTFE
h. Ball: Chrome-plated brass
i. Ends: Threaded
j. Port: Full

B. Gas Shut-Off Cocks, Below Grade:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Nordstom "Poly-Gas" or comparable product by one of the following:

a. Or approved equal.

2. Description:

a. Standards: ASTM D-2513 and ANSI B16.40
b. Valve boxes: cast iron tops marked "GAS", high-impact heavy-duty ABS valve can as manufactured by C.O. Test Services-VALVCO, Inc. or equal.

2.9 LPG SHUT-OFF COCKS:

A. LPG Shut-Off Cocks, Above Grade (3" and smaller):

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1. Basis-of-Design Product: Subject to compliance with requirements, provide NIBCO Model T-585-70-UL (1/2" – 1") and T-580-70-UL (1-1/4" – 3") or a comparable product by one of the following:

a. Or approved equal.

2. Description:

a. Standard: MSS SP-110, CSA certified and UL/FM listed.
b. CWP Rating: 600 psig.
c. SWP Rating: 150 psig.
d. Gas Rating: 250 psi non-shock LP gas per UL842.
e. Body Design: Two piece with threaded body pack nut design (no threaded stem designs al-lowed) with adjustable stem packing.
f. Body Material: Dezincification-resistant brass.
g. Seats: PTFE
h. Ball: Chrome-plated brass
i. Ends: Threaded
j. Port: Full port (1/2" – 1"), conventional port (1-1/4" – 3")

B. LPG Shut-Off Cocks, Below Grade:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Nordstom "Poly-Gas" or comparable product by one of the following:

    a. Or approved equal.

2. Description:

    a. Standards: ASTM D-2513 and ANSI B16.40
    b. Valve boxes: cast iron tops marked "GAS", high-impact heavy-duty ABS valve can as manufactured by C.O. Test Services-VALVCO, Inc. or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

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D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Locate valves for easy access and provide separate support where necessary.

C. Install valves in horizontal piping with stem at or above center of pipe.

D. Install valves in position to allow full stem movement.

E. Install check valves for proper direction of flow and as follows:

1. Swing Check Valves: In horizontal position with hinge pin level.
2. Check Valves: In horizontal or vertical position, between flanges.
3. Lift Check Valves: With stem upright and plumb.

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. If valve applications are not indicated, use the following:

1. Shutoff Service: Ball, butterfly valves.
2. Butterfly Valve Dead-End Service: Single-flange (lug) type.
3. Throttling Service: Ball or Butterfly valves.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:

1. For Copper Tubing, NPS 2 and Smaller: Threaded ends.
2. For Copper Tubing, NPS 2-1/2 to NPS 4: Flanged ends.
3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
4. For Steel Piping, NPS 2-1/2 to NPS 4: Flanged ends.

3.5 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE

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A. Pipe NPS 2 and Smaller:

1. Bronze Valves: Threaded ends.
2. Ball Valves: Two piece, full port, bronze with stainless-steel trim.
3. Bronze Lift Check Valves: Class 125, nonmetallic TFE disc.
4. Bronze Swing Check Valves: Class 150, nonmetallic TFE disc.
5. Bronze Gate Valves: Class 150, RS.

B. Pipe NPS 2-1/2 and Larger:

1. Ductile-Iron, Single-Flange Butterfly Valves: 200 CWP, EPDM seat, aluminum-bronze disc.

END OF SECTION 22 05 23

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.

B. Related Sections:

1. Section 055000 "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.

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1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.

1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

1.5 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.6 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

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1.7 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.8 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.9 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.10 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

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B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.11 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.12 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

   a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
   b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
   c. Include all pertinent construction, installation, performance and technical data.
   d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

      1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
      2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

   e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

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1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled “SPECIFIED ITEM, NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor’s responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

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1.13 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.14 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.15 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.16 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

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B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 Pipe Supports: Unless otherwise indicated on the drawings, shall be as follows:

A. The Contractor shall furnish and install all miscellaneous iron work including angles, channels, etc., required to appropriately support the various piping systems. Hanger spacing and location shall conform to 2016 California Plumbing Code Table 313.1.

B. All horizontal runs of piping within the building to be supported from the structural framing with steel rods and split ring hangers, B-Line, Grinnell Company, Tolco, or approved equal. Steel rods shall be secured to overhead framing with side beam connectors. Where necessary,

install angle iron between framing to accommodate hanger rods. Where several pipes are running together, Unistrut, B-Line or Powerstrut channels with clamps may be used in lieu of individual pipe hangers, and supported from structure as herein specified. Submit test data for type of hanger supports to be provided. For support conditions other than specified herein, the Contractor shall submit method of support for approval prior to any installation.

C. Horizontal Piping Hangers and Supports:

1. General: Provide factory fabricated horizontal hangers and supports complying with one of the following MSS types listed to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of hangers and supports to exactly fit pipe size for bare piping, and to exactly fit around piping insulation with saddle or shield for insulated piping. Provide copper-plated hangers and supports for copper-piping systems.

   a. Adjustable Steel Clevis Hangers: (MSS Type 1.) B-Line B 3100
   b. Adjustable Swivel Pipe Rings: (MSS Type 5) B-Line B3690

D. Vertical-Piping Clamps:

1. General: Provide factory fabricated vertical-piping clamps complying with the following types listed, to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
2. Two-Bolt Riser Clamps: (MSS Type 8) B-Line B3373

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E. Hanger-Rod Attachments:

1. General: Provide factory fabricated hanger-rod attachments B-Line, Tolco or approved equal, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-58 and manufacturer's published product information. Select size of hanger-rod attachment to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.
2. Side beam eye socket, Tolco Fig. #57 for rod sizes 3/8" dia. and Tolco Fig. #25-30-251 for rod sizes 1/2" dia.

F. Building Attachments:

1. General: Provide factory fabricated building attachments, selected by Installer to suit building structural framing conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.

G. Hanger Rods and Spacing shall conform to the following table:

Pipe Sizes	Spacing	Rods
2 Inch and Smaller	6 Feet	3/8 Inch
2-1/2 Inch to 3 Inch	8 Feet	1/2 Inch
4 Inch and larger	8 Feet	5/8 Inch

H. Hangers and Supports shall be adequate to maintain alignment and prevent sagging and shall be placed within 18 inches of joint. Support shall be provided at each horizontal branch connection.

I. Provide lateral bracing as manufactured by B-Line or approved equal for all piping to prevent swaying or movement in accordance with SMACNA "Guidelines for Seismic Restraints of Piping Systems". Piping smaller than indicated in the guidelines shall be provided with bracing as specified for the smallest size indicated. The entire water distribution system shall be properly braced and will not move due to the action of quick closing of valves.

J. Miscellaneous Supports, Wall Brackets, Etc.: Provide where required in accordance with the best standard practices of the trade. Submit shop drawings for all fabricated supports.

2.2 Isolators. All piping which is not isolated from contact with the building by its insulation shall be installed with a manufactured type isolator. Isolators shall be B-Line vibra clamp and cushion, Super Strut, Stoneman "Trisolator", or approved equal. Piping shall be installed and supported in a manner to provide for expansion without strains. Guides shall be properly installed to ensure this requirement.

2.3 Shields:

A. General: Provide shields at piping hangers and supports, factory-fabricated, for all insulated piping as manufactured by Pipeshields Incorporated or approved equal. Size shields for exact fit to mate with pipe insulation.

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1. Protection Shields: MSS Type 40; provide high density insert of same thickness of insulation or equal 100-psi average compressive strength, waterproofed calcium silicate, encased with a sheet metal shield. Insert and shield shall cover entire circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

2.4 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

B. Stainless-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.

3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

C. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

2.5 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.6 THERMAL-HANGER SHIELD INSERTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ERICO International Corporation.
2. PHS Industries, Inc.
3. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
4. Piping Technology & Products, Inc.

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B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate with 100-psig ASTM C 552 or Type II cellular glass with 100-psig minimum compressive strength.

C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.7 FASTENER SYSTEMS

A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

B. Mechanical-Expansion Anchors: Insert-wedge-type, stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

2.8 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.

1. Properties: Nonstaining, noncorrosive, and nongaseous.
2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.

B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.

1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.

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C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

D. Fastener System Installation:

1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

E. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.

F. Equipment Support Installation: Fabricate from welded-structural-steel shapes.

G. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

H. Install lateral bracing with pipe hangers and supports to prevent swaying.

I. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.

L. Insulated Piping:

1. Attach clamps and spacers to piping.

   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.

2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

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   a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.

3. Shield Dimensions for Pipe: Not less than the following:

   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.

4. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for equipment and make bearing surface smooth.

C. Provide lateral bracing, to prevent swaying, for equipment supports.

3.3 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.4 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

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3.5 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Touchup: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Section 099123 "Interior Painting."

C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.6 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use carbon-steel pipe hangers and supports metal trapeze pipe hangers and attachments for general service applications.

F. Use stainless-steel pipe hangers and stainless-steel attachments for hostile environment applications.

G. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.

H. Use thermal-hanger shield inserts for insulated piping and tubing.

I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
2. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.

J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

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1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.

K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction, to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.

5. C-Clamps (MSS Type 23): For structural shapes.
6. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
7. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
8. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
9. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
2. Thermal-Hanger Shield Inserts: For supporting insulated pipe.

N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.

O. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

END OF SECTION 22 05 29

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SECTION 22 05 53 - IDENITIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Equipment labels.
2. Warning signs and labels.
3. Pipe labels.
4. Valve tags.
5. Warning tags.

1.3 WORK INCLUDED

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A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

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1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and

mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

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1.10 SUBMITTAL DATA

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style, and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

F. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of

the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.

3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

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G. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit

detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 COORDINATION

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A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

1.12 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.13 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations,

plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.14 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

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A. Metal Labels for Equipment:

1. Material and Thickness: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
4. Fasteners: Stainless-steel rivets or self-tapping screws.
5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: Black.

C. Background Color: White.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

H. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

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A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 incheshigh.

2.4 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.

1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
2. Fasteners: Brass wire-link or beaded chain; or S-hook.

B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.

1. Valve-tag schedule shall be included in operation and maintenance data.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.

1. Size: 3 by 5-1/4 inches minimum.
2. Fasteners: Brass grommet and wire.
3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

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A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Section 099123 "Interior Painting."

B. Stenciled Pipe Label Option: Stenciled labels may be provided instead of manufactured pipe labels, at Installer's option. Install stenciled pipe labels with painted, color-coded bands or rectangles on each piping system.

1. Identification Paint: Use for contrasting background.
2. Stencil Paint: Use for pipe marking.

C. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:

1. Near each valve and control device.
2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
4. At access doors, manholes, and similar access points that permit view of concealed piping.
5. Near major equipment items and other points of origination and termination.
6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

D. Pipe Label Color Schedule:

1. Domestic Water Piping:

   a. Background Color: White.
   b. Letter Color: Black.

2. Sanitary Waste and Storm Drainage Piping:

   a. Background Color: White.
   b. Letter Color: Black.

3.4 VALVE-TAG INSTALLATION

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A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:

1. Valve-Tag Size and Shape:

   a. Cold Water: 1-1/2 inches, round.
   b. Hot Water: 1-1/2 inches, round.

2. Valve-Tag Color:

   a. Cold Water: Natural.
   b. Hot Water: Natural.

3. Letter Color:

   a. Cold Water: Black.
   b. Hot Water: Black.

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 22 05 53

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SECTION 22 07 19 - PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following plumbing piping services:

1. Domestic cold-water piping.
2. Domestic hot-water piping.
3. Supplies and drains for handicap-accessible lavatories and sinks.

B. Related Sections:

1. Section 220716 "Plumbing Equipment Insulation."

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1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

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D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

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C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

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1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.11 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

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1.12 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84 by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.

1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

C. Comply with the following applicable standards and other requirements specified for miscellaneous components:

1. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.13 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.14 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.15 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

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B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

1.16 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.17 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for

installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.18 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Hot Water Pipe Insulation: All hot water supply and return piping, except exposed connections to plumbing fixtures, flanges and unions shall be insulated with ASTM C547, Class I, "Johns-Manville" "Micro-Lock" 850-APT, Owens-Corning Fiberglass Corp., ASJ/SL-11 or approved equal, 1" thick for sizes up to 2" and 1-1/2" thick for sizes 2" and larger with “Johns-Manville” “Zeston” pre-formed insulation inserts for all fittings. Insulation at all fittings shall be equal in thickness to insulation for piping. Insulation shall have a flame spread of not more than 25 and a smoke density not exceeding 50 per 2016 CMC

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1. Exposed insulated piping in occupied areas and exposed outside the building shall be covered with Johns-Manville” “Zeston” 30-mil thick white PVC jacketing material per ASTM D1784 with “Johns-Manville” “Zeston” pre-formed insulation inserts for all fittings. Insulation at all fittings shall be equal in thickness to insulation for piping. Jacketing shall comply with ASTM E84, and shall have a flame spread of not more than 25 and a smoke density not exceeding 50 per 2016 CMC.
2. Hot water piping below slab shall have insulation protected by a 10-mil thick polyethylene plastic sleeve sealed watertight with poly vinyl chloride tape.

B. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

C. Products shall not contain asbestos, lead, mercury, or mercury compounds.

D. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

E. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

F. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

G. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:

a. Johns Manville; Micro-Lok.
b. Knauf Insulation; 1000-Degree Pipe Insulation.
c. Owens Corning; Fiberglas Pipe Insulation.

2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

H. Polyolefin: Unicellular, polyethylene thermal plastic insulation. Comply with ASTM C 534 or ASTM C 1427, Type I, Grade 1 for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Armacell LLC; Tubolit.
b. Nomaco Insulation; IMCOLOCK and NOMALOCK.

I. Condensate Pipe Insulation: All condensate piping within the building shall be insulated with "Imcoa" "Imcolock" ¾" nominal wall thickness closed-cell insulation. Insulation shall have a flame spread of not more than 25 and a smoke density not exceeding 50 per 2016 CMC. All joints shall be mitered and secured with black duct tape.

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J. Indirect Waste Pipe Insulation: All indirect waste drains from refrigerated kitchen equipment shall be insulated with "Armacell" "Armaflex" insulating tape.

K. All insulation shall be continuous through supports and hangers.

L. All fixtures complying with the provisions of the Americans with Disabilities Act shall be provided with Prowrap insulation for exposed hot water pipe, tailpiece, and trap as manufactured by McGuire, and secured per manufacturers recommendations. No tape wrapping shall be permitted.

2.2 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
b. Eagle Bridges - Marathon Industries; 225.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.

2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Phenolic Adhesive: Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-96.
b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 81-33.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

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1. Products: Subject to compliance with requirements, provide one of the following:

a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. PVC Jacket Adhesive: Compatible with PVC jacket.

1. Products: Subject to compliance with requirements, provide the following:

a. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.3 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.

1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 428 AWF ASJ.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
c. Compac Corporation; 104 and 105.
d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.

2. Width: 3 inches.
3. Thickness: 11.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.

B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.

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1. Products: Subject to compliance with requirements, provide one of the following:

a. ABI, Ideal Tape Division; 370 White PVC tape.
b. Compac Corporation; 130.
c. Venture Tape; 1506 CW NS.

2. Width: 2 inches.
3. Thickness: 6 mils.
4. Adhesion: 64 ounces force/inch in width.
5. Elongation: 500 percent.
6. Tensile Strength: 18 lbf/inch in width.

2.4 SECUREMENTS

A. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.5 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers,:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

a. McGuire Manufacturing.

2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.

1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

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B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:

1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.

C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.

D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.

C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

D. Install insulation with longitudinal seams at top and bottom of horizontal runs.

E. Install multiple layers of insulation with longitudinal and end seams staggered.

F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.

G. Keep insulation materials dry during application and finishing.

H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.

I. Install insulation with least number of joints practical.

J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.

1. Install insulation continuously through hangers and around anchor attachments.
2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

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K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

L. Install insulation with factory-applied jackets as follows:

1. Draw jacket tight and smooth.
2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.

    a. For below-ambient services, apply vapor-barrier mastic over staples.

4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.

M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

P. For above-ambient services, do not install insulation to the following:

1. Vibration-control devices.
2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
4. Seal jacket to roof flashing with flashing sealant.

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B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.

1. Seal penetrations with flashing sealant.
2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.

1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:

1. Pipe: Install insulation continuously through floor penetrations.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:

1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for

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above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:

1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

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3.6 INSTALLATION OF MINERAL-FIBER INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.

B. Insulation Installation on Pipe Flanges:

1. Install preformed pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install preformed sections of same material as straight segments of pipe insulation when available.
2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
4. Install insulation to flanges as specified for flange insulation application.

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3.7 INSTALLATION OF POLYOLEFIN INSULATION

A. Insulation Installation on Straight Pipes and Tubes:

1. Seal split-tube longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:

1. Install pipe insulation to outer diameter of pipe flange.
2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of polyolefin sheet insulation of same thickness as pipe insulation.
4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:

1. Install mitered sections of polyolefin pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:

1. Install cut sections of polyolefin pipe and sheet insulation to valve body.
2. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
3. Install insulation to flanges as specified for flange insulation application.
4. Secure insulation to valves and specialties, and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

3.8 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.

a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

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D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.

D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:

1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Hot and Recirculated Hot Water:

1. NPS 1-1/4 and Smaller: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

2. NPS 1-1/2 and Larger: Insulation shall be the following:

a. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

B. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:

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1. All Pipe Sizes: Insulation shall be the following:

a. McGuire pre-insulated trap and supply covers.

END OF SECTION 22 07 19

SECTION 22 11 16 - DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Under-building-slab and aboveground domestic water pipes, tubes, and fittings inside buildings.
2. Encasement for piping.

B. Related Requirements:

1. Section 221113 "Facility Water Distribution Piping" for water-service piping outside the building from source to the point where water-service piping enters the building.

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1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

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D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 UTILITIES

A. See Drawings for Points of Connection.

B. Certain site utilities are to be connected to and extended. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact location and depth of lines to which he is to connect. In event depth of lines is not sufficient to permit connection in manner indicated, Contractor shall obtain direction from the Owner's representative before proceeding with this work.

C. Verify that utility companies size their services and meters to suit ultimate demand indicated on the drawings.

D. Domestic Water: The Contractor shall be responsible for the domestic water service outside of the building within five feet (5') of the foundation, and within the building itself. See Civil Engineer's plans for onsite domestic water system.

E. Domestic Water Service: The Contractor shall arrange with the serving utility company for the installation of all water meter assemblies and reduced pressure backflow devices, including the service mains and vaults, and all required appurtenances as indicated on the drawings and in accordance with serving utility standards and shall pay all costs incurred. All required capacity fees, frontage fees and inspections, shall be paid for by the Owner. Contractor shall provide necessary tap-in connections in water main for sterilizing of domestic water system. Contractor shall connect into the main water service line as indicated on the drawings. The installation shall be in accordance with the serving utility company's standards.

1.8 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

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1.9 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.10 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in

walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.11 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

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a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
c. Include all pertinent construction, installation, performance and technical data.
d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

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1.12 ACTION SUBMITTALS

A. Product Data: For transition fittings and dielectric fittings.

1.13 INFORMATIONAL SUBMITTALS

A. System purging and disinfecting activities report.

B. Field quality-control reports.

1.14 FIELD CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of water service.
2. Do not interrupt water service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Piping within the building and above grade shall be Type "L" ASTM B88, hard drawn copper tubing with wrought copper sweat fittings ANSI B16.18 and B16.22,

B. Outdoor underground piping in sizes 2-1/2" and 3" shall be Type "L" ASTM B88, hard drawn copper as specified for water piping within the building. Piping 2" and smaller shall be Type "K" ASTM B88, hard drawn copper with wrought copper sweat fittings ANSI B16.18 and B16.22.

C. Piping below the building floor shall be Type "K" soft annealed copper tubing with no fittings below the slab.

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2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.

B. Soft Copper Tube: ASTM B 88, Type K water tube, annealed temper.

C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

D. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.

E. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends.

2.3 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials:

1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
2. Full-face or ring type unless otherwise indicated.

B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

C. Solder Filler Metals: ASTM B 32, lead-free alloys.

D. Flux: ASTM B 813, water flushable.

E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.4 ENCASEMENT FOR PIPING

A. Standard: ASTM A 674 or AWWA C105/A21.5.

B. Form: Sheet or tube.

C. Color: natural.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

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3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105/A21.5.

D. Install shutoff valve, strainer, pressure gage, and test tee with valve inside the building at each domestic water-service entrance. Comply with requirements for pressure gages in Section 220519 "Meters and Gages for Plumbing Piping" and with requirements for drain valves and strainers in Section 221119 "Domestic Water Piping Specialties."

E. Install shutoff valve immediately upstream of each dielectric fitting.

F. Install domestic water piping level without pitch and plumb.

G. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

H. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

I. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

J. Install piping to permit valve servicing.

K. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.

L. Install piping free of sags and bends.

M. Install fittings for changes in direction and branch connections.

N. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.

O. Install thermometers on outlet piping from each water heater. Comply with requirements for thermometers in Section 220519 "Meters and Gages for Plumbing Piping."

P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

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R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.

D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Brazed Joints" chapter.

E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.

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E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 2 and Smaller: 72 inches with 3/8-inch rod.
2. NPS 2-1/2 to NPS 3: 8 feet with 1/2-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:

1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.
3. Equipment: Cold- and hot-water-supply piping as indicated, but not smaller than equipment connections. Provide shutoff valve and union for each connection. Use flanges instead of unions for NPS 2-1/2 and larger.

3.6 PIPE AND EQUIPMENT IDENTIFICATION

A. Each operating and service line shut-off valve shall be identified by a 19 ga. brass tag with stamped, engraved type of service identified and area served, complete with hole and brass chain mounted on valve stem or handle. Tag shall be a minimum of one and one-half inch (1-1/2") in diameter.

B. All piping systems shall be readily identifiable by appropriate labeling with the name of the piping contained. Such labeling shall be by means of metal tags, stenciling, stamping, or with adhesive markers, in a manner that is not readily removable. Labeling shall appear on the piping at intervals of not more than 20 ft and at least once in each room and each story traversed by the piping system.

C. Provide on exterior wall of each building opposite the building's main gas service a sign reading "Gas Shut Off". Sign shall be metal with minimum 1-1/2" high-embossed letters.

1. All equipment shall be provided with name plate indicating all pertinent information on it

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3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

    a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
    b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
    c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
    d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
    e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
    f. Prepare reports for tests and for corrective action required.

B. Domestic water piping will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.8 ADJUSTING

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A. Perform the following adjustments before operation:

1. Close drain valves, hydrants, and hose bibbs.
2. Open shutoff valves to fully open position.
3. Open throttling valves to proper setting.
4. Adjust balancing valves in hot-water-circulation return piping to provide adequate flow.

    a. Manually adjust ball-type balancing valves in hot-water-circulation return piping to provide hot-water flow in each branch.
    b. Adjust calibrated balancing valves to flows indicated.

5. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
6. Remove and clean strainer screens. Close drain valves and replace drain plugs.
7. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
8. Check plumbing specialties and verify proper settings, adjustments, and operation.

3.9 CLEANING

A. Clean and disinfect potable domestic water piping as follows:

1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.

2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:

    a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    b. Fill and isolate system according to either of the following:

        1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours. Operate all valves during the retention period.
        2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours. Operate all valves during the retention period.

    c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    d. Repeat procedures if biological examination shows contamination.
    e. Submit water samples in sterile bottles to authorities having jurisdiction.

B. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

C. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

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3.10 TESTING

A. No piping work shall be concealed or covered until piping has been tested, inspected and approved by the Inspector. All piping for plumbing systems shall be completely installed and tested as required by the Uniform Plumbing Code. Test pressures and times indicated are a minimum only. All tests shall be as required by the governing authority as well.

3.11 OPERATION INSTRUCTION

A. Prior to occupancy or prior to the date of final inspection, whichever may occur first, the Contractor shall prepare two (2) sets of typewritten instructions for the operation of all equipment, valves, etc., specified and furnished as a part of the work under this section, and shall assign a competent person, thoroughly familiar with the job, to demonstrate and instruct a representative of the Owner in the operation of the equipment. The time of said demonstration and instructions shall be arranged with the Owner's representative approximately one (1) week in advance. Verbal instructions shall include shut-off location of gas and water. The Contractor shall assemble all operation and maintenance data supplied by the manufacturers of the various pieces of equipment, all keys and special wrenches required to operate and service the equipment (including keys for yard boxes, gas stops and fixture stops), and all equipment warranties and deliver same to the representative of the Owner on date of said instructions.

3.12 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.

C. Fitting Option: Extruded-tee connections and brazed joints may be used on aboveground copper tubing.

D. Under-building-slab, domestic water, building-service piping, NPS 3 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and brazed joints.

E. Under-building-slab, domestic water piping, NPS 2 and smaller, shall be the following:

1. Soft copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and brazed joints.

F. Aboveground domestic water piping shall be the following:

1. Hard copper tube, ASTM B 88, Type L; wrought-copper, solder-joint fittings; and soldered joints.

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3.13 VALVE SCHEDULE

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Shutoff Duty: Use ball valves for piping NPS 2 and smaller. Use butterfly valves with flanged ends for piping NPS 2-1/2 and larger.

B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

END OF SECTION 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Vacuum breakers.
2. Backflow preventers.
3. Water pressure-reducing valves.
4. Balancing valves.
5. Temperature-actuated, water mixing valves.
6. Hose bibbs.
7. Water-hammer arresters.
8. Trap-seal primer valves.
9. Trap-seal primer systems.

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B. Related Requirements:

1. Section 223200 "Domestic Water Filtration Equipment" for water filters in domestic water piping.
2. Retain subparagraphs below to cross-reference requirements Contractor might expect to find in this Section but are specified in other Sections.
3. Section 224300 "Medical Plumbing Fixtures" for thermostatic mixing valves for sitz baths, thermostatic mixing-valve assemblies for hydrotherapy equipment, and outlet boxes for dialysis equipment.
4. Section 224500 "Emergency Plumbing Fixtures" for water tempering equipment.
5. Section 224713 "Drinking Fountains" for water filters for water coolers.
6. Section 224716 "Electric Water Coolers" for water filters for water coolers.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

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1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 UTILITIES

A. See Drawings for Points of Connection.

B. Certain site utilities are to be connected to and extended. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact location and depth of lines to which he is to connect. In event depth of lines is not sufficient to permit connection in manner indicated, Contractor shall obtain direction from the Owner's representative before proceeding with this work.

C. Verify that utility companies size their services and meters to suit ultimate demand indicated on the drawings.

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D. Domestic Water: The Contractor shall be responsible for the domestic water service outside of the building within five feet (5') of the foundation, and within the building itself. See Civil Engineer's plans for onsite domestic water system.

E. Domestic Water Service: The Contractor shall arrange with the serving utility company for the installation of all water meter assemblies and reduced pressure backflow devices, including the service mains and vaults, and all required appurtenances as indicated on the drawings and in accordance with serving utility standards and shall pay all costs incurred. All required capacity fees, frontage fees and inspections, shall be paid for by the Owner. Contractor shall provide necessary tap-in connections in water main for sterilizing of domestic water system. Contractor shall connect into the main water service line as indicated on the drawings. The installation shall be in accordance with the serving utility company's standards.

1.9 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.10 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.11 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

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C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.12 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
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4. To be valid, all submittals must:

   a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
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   d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

      1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
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   e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

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   a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

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   b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.13 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

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1.14 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.15 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

1.16 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES

A. Potable-water piping and components shall comply with NSF 61 and NSF 14.

2.2 PERFORMANCE REQUIREMENTS

A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

2.3 VACUUM BREAKERS

A. Pipe-Applied, Atmospheric-Type Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

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a. Ames Fire & Waterworks; a division of Watts Water Technologies, Inc.
b. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
c. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.

3. Standard: ASSE 1001.
4. Size: NPS 1/4 to NPS 3 (DN 8 to DN 80), as required to match connected piping.
5. Body: Bronze.
6. Inlet and Outlet Connections: Threaded.
7. Finish: Rough bronze.

B. Hose-Connection Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
b. Woodford Manufacturing Company; a division of WCM Industries, Inc.
c. Zurn Industries, LLC; Plumbing Products Group; Light Commercial Products.
d. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.

3. Standard: ASSE 1011.
4. Body: Bronze, nonremovable, with manual drain.
5. Outlet Connection: Garden-hose threaded complying with ASME B1.20.7.
6. Finish: Rough bronze.

C. Pressure Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Ames Fire & Waterworks; a division of Watts Water Technologies, Inc.
    b. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
    c. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.

3. Standard: ASSE 1020.
4. Operation: Continuous-pressure applications.
5. Pressure Loss: 5 psig maximum, through middle third of flow range.
6. Size: See plans.
7. Design Flow Rate: See plans.
8. Selected Unit Flow Range Limits: See plans.
9. Accessories:

    a. Valves: Ball type, on inlet and outlet.

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D. Laboratory-Faucet Vacuum Breakers:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
    b. Woodford Manufacturing Company; a division of WCM Industries, Inc.
    c. Zurn Industries, LLC; Plumbing Products Group; Wilkins Water Control Products.

3. Standard: ASSE 1035.
4. Size: NPS 1/4 or NPS 3/8 (DN 8 or DN 10) matching faucet size.
5. Body: Bronze.
6. End Connections: Threaded.
7. Finish: Chrome plated.

2.4 TEMPERATURE-ACTUATED, WATER MIXING VALVES

A. Water-Temperature Limiting Devices:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Symmons Industries, Inc.
    b. Bradley.

3. Standard: ASSE 1017.
4. Pressure Rating: 125 psig (860 kPa).
5. Type: Thermostatically controlled, water mixing valve.
6. Material: Bronze body with corrosion-resistant interior components.
7. Connections: Threaded[union] inlets and outlet.
8. Accessories: Check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
9. Tempered-Water Setting: 120°F.
10. Tempered-Water Design Flow Rate: 0.35 GPM.
11. Valve Finish: Rough bronze.

B. Primary, Thermostatic, Water Mixing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    a. Symmons Industries, Inc.
    b. Bradley.

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3. Standard: ASSE 1017.
4. Pressure Rating: 125 psig (860 kPa)minimum unless otherwise indicated.
5. Type: Exposed-mounted or Cabinet-type (Refer to Plumbing Fixture Schedule), thermostatically controlled, water mixing valve.
6. Material: Bronze body with corrosion-resistant interior components.
7. Connections: Threaded[union] inlets and outlet.
8. Accessories: Manual temperature control, check stops on hot- and cold-water supplies, and adjustable, temperature-control handle.
9. Tempered-Water Setting: 120°F.
10. Tempered-Water Design Flow Rate: 0.35 GPM.
11. Selected Valve Flow Rate at 45-psig (310-kPa) Pressure Drop: 0.35 GPM.
12. Valve Finish: Rough bronze.
13. Piping Finish: Copper.
14. Cabinet: Factory fabricated, stainless steel, for recessed or surface (Refer to Plumbing Fixture Schedule) mounting and with hinged, stainless-steel door.

C. Individual-Fixture, Water Tempering Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Symmons Industries, Inc.
    b. Bradley.

3. Standard: ASSE 1016, thermostatically controlled, water tempering valve.
4. Pressure Rating: 125 psig (860 kPa) minimum unless otherwise indicated.
5. Body: Bronze body with corrosion-resistant interior components.
6. Temperature Control: Adjustable.
7. Inlets and Outlet: Threaded.
8. Finish: Rough or chrome-plated bronze.
9. Tempered-Water Setting: 110°F.
10. Tempered-Water Design Flow Rate: 0.35 GPM.

D. Primary Water Tempering Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Symmons Industries, Inc.
    b. Bradley.

3. Standard: ASSE 1017, thermostatically controlled, water tempering valve, listed as tempering valve.
4. Pressure Rating: 125 psig (860 kPa) minimum unless otherwise indicated.
5. Body: Bronze.
6. Temperature Control: Manual.
7. Inlets and Outlet: Threaded.
8. Selected Primary Water Tempering Valve Size: See plans.
9. Tempered-Water Setting: 120°F.
10. Tempered-Water Design Flow Rate: See plans.
11. Tempered-Water Outlet Size: See plans for end connection.
12. Cold-Water Inlet Size: See plans for end connection.
13. Hot-Water Inlet Size: See plans for end connection.
14. Valve Finish: Rough bronze.

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2.5 OUTLET BOXES

A. Clothes Washer Outlet Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Acorn Engineering Company.
    b. Guy Gray Manufacturing Co., Inc.
    c. IPS Corporation.
    d. Symmons Industries, Inc.
    e. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
    f. Whitehall Manufacturing; a div. of Acorn Engineering Company.
    g. Zurn Industries, LLC; Plumbing Products Group; Light Commercial Products.

3. Mounting: Recessed.
4. Material and Finish: Plastic box and faceplate.
5. Faucet: Combination valved fitting or separate hot- and cold-water valved fittings complying with ASME A112.18.1. Include garden-hose thread complying with ASME B1.20.7 on outlets.
6. Supply Shutoff Fittings: NPS 1/2 (DN 15) gate, globe, or ball valves and NPS 1/2 (DN 15) copper, water tubing.
7. Drain: NPS 2 (DN 50) standpipe and P-trap for direct waste connection to drainage piping.
8. Inlet Hoses: Two 60-inch- (1500-mm-) long, rubber household clothes washer inlet hoses with female, garden-hose-thread couplings. Include rubber washers.
9. Drain Hose: One 48-inch- (1200-mm-) long, rubber household clothes washer drain hose with hooked end.

B. Icemaker Outlet Boxes:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

   a. Acorn Engineering Company.
   b. IPS Corporation.

3. Mounting: Recessed.
4. Material and Finish Plastic box and faceplate.
5. Faucet: Valved fitting complying with ASME A112.18.1. Include NPS 1/2 (DN 15) or smaller copper tube outlet.
6. Supply Shutoff Fitting: NPS 1/2 (DN 15) gate, globe, or ball valve and NPS 1/2 (DN 15) copper, water tubing.

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2.6 HOSE BIBBS

A. Hose Bibbs:

1. Standard: ASME A112.18.1 for sediment faucets.
2. Body Material: Bronze.
3. Seat: Bronze, replaceable.
4. Supply Connections: NPS 3/4 threaded or solder-joint inlet.
5. Outlet Connection: Garden-hose thread complying with ASME B1.20.7.
6. Pressure Rating: 125 psig.
7. Vacuum Breaker: Integral nonremovable, drainable, hose-connection vacuum breaker complying with ASSE 1011.
8. Include operating key with each operating-key hose bibb.

2.7 WATER-HAMMER ARRESTERS

A. Water-Hammer Arresters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Precision Plumbing Products, Inc.
    b. Zurn Industries, LLC; Plumbing Products Group; Specification Drainage Products.

2. Standard: ASSE 1010 or PDI-WH 201.
3. Type: Metal bellows.
4. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

2.8 TRAP-SEAL PRIMER DEVICE

A. Supply-Type, Trap-Seal Primer Device:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. MIFAB, Inc.
    b. Precision Plumbing Products, Inc.
    c. Sioux Chief Manufacturing Company, Inc.

2. Standard: ASSE 1018.
3. Pressure Rating: 125 psig minimum.
4. Body: Bronze.
5. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
6. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.
7. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

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2.9 TRAP-SEAL PRIMER SYSTEMS

A. Trap-Seal Primer Systems:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Precision Plumbing Products, Inc.

2. Standard: ASSE 1044.
3. Piping: NPS 3/4, ASTM B 88, Type L; copper, water tubing.
4. Cabinet: Surface-mounted steel box with stainless-steel cover.
5. Electric Controls: 24-hour timer, solenoid valve, and manual switch for 120-V ac power.

    a. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

6. Vacuum Breaker: ASSE 1001.
7. Number Outlets: Four.

8. Size Outlets: NPS 1/2.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install water-hammer arresters in water piping according to PDI-WH 201.

B. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

C. Install trap-seal primer systems with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust system for proper flow.

3.2 Access Panels:

A. Wall access panels shall be minimum 12" x 12" for concealed valves and other equipment unless otherwise specified or indicated. Ceiling access panels shall be 18" x 18" minimum. Access panels shall be located and positioned for ready access and service of equipment housed within. Where access panels are specified with keyed cylinder locks, all such locks shall be identically keyed.
1. Wall, Non-Fire Rated: Elmdor/Stoneman DW-SS-CL, drywall, stainless steel finish, cylinder lock.
2. Ceiling, Non-fire Rated: Elmdor/Stoneman DW, drywall, prime coated finish, screwdriver latch.
3. Wall, Fire Rated: Elmdor/Stoneman FR-SS-CL, fire rated, stainless steel finish, cylinder lock.
4. Ceiling, Fire rated: Elmdor/Stoneman FRC, Fire rated, prime coated finish, return latch.
5. Wall, Non-Fire Rated: Elmdor/Stoneman DW-SS-AKL, drywall, stainless steel finish, allen key latch.
6. Ceiling, Non-fire Rated: Elmdor/Stoneman DW, drywall, prime coated finish, screwdriver latch.
7. Wall, Fire Rated: Elmdor/Stoneman FR-SS, fire rated, stainless steel finish, return latch.
8. Ceiling, Fire rated: Elmdor/Stoneman FRC, Fire rated, prime coated finish, return latch.

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3.3 CONNECTIONS

A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding for Electrical Systems."

B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

3.4 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
   1. Supply-type, trap-seal primer valves.
   2. Trap-seal primer systems.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.5 FIELD QUALITY CONTROL

A. Domestic water piping specialties will be considered defective if they do not pass tests and inspections.

B. Prepare test and inspection reports.

3.6 ADJUSTING

A. Set field-adjustable pressure set points of water pressure-reducing valves.

B. Set field-adjustable flow set points of balancing valves.

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C. Set field-adjustable temperature set points of temperature-actuated, water mixing valves.

END OF SECTION 22 11 19

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.
3. Encasement for underground metal piping.

B. Related Sections:
1. Section 221313 "Facility Sanitary Sewers" for sanitary sewerage piping and structures outside the building.

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1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

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C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 UTILITIES

A. See Drawings for Points of Connection.

B. Certain site utilities are to be connected to and extended. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact location and depth of lines to which he is to connect. In event depth of lines is not sufficient to permit connection in manner indicated, Contractor shall obtain direction from the Owner's representative before proceeding with this work.

C. Verify that utility companies size their services and meters to suit ultimate demand indicated on the drawings.

D. Sanitary Sewer: The Contractor shall be responsible for the soil and waste piping outside of the building within five feet (5') of the foundation, and within the building itself. See Civil Engineer's plans for onsite sewer system.

1.9 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

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1.10 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.11 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in

walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.12 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

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B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.13 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

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1.14 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

1.15 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of sanitary waste service.
2. Do not proceed with interruption of sanitary waste service without Architect's written permission.

1.16 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

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B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.17 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.18 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. ASTM C 1540, CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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a. ANACO-Husky SD 4000 series.
b. Clamp All HI_TORQ 125 series

2. Standards: ASTM C 1277 and CISPI 310.
3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

C. Soil and waste piping within the building itself and outside within five feet (5') of the foundation, shall be no-hub cast iron pipe and fittings, asphaltum coated, free from defects, and shall comply with CISPI. Standard 301, ASTM A-888 or ASTM A-74. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute. Fittings shall be made up with "Husky" SD 4000 series or “Clamp All” HI-TORQ 125 series stainless steel type 304 couplings and shall conform to ASTM C1540 & ASTM C564 except all above ground vent pipe fittings may be made with "Anaco" or "Tyler" stainless steel two band couplings conforming to CISPI Standard 310.

PART 3 - EXECUTION

3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

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G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

K. Make changes in direction for soil and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

L. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

M. Install soil and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:

1. Sanitary Drain: 2 percent downward in direction of flow for piping NPS 3 and smaller; 1 percent downward in direction of flow for piping NPS 4 and larger.

2. Vent Piping: 1 percent down toward vertical fixture vent or toward vent stack.

N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105/A 21.5.

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O. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in sanitary drainage force-main piping. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."

2. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."

P. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

R. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

B. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

3.4 HANGER AND SUPPORT INSTALLATION

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A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:
    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install hangers for steel piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4: 84 inches with 3/8-inch rod.
2. NPS 1-1/2: 108 inches with 3/8-inch rod.
3. NPS 2: 10 feet with 3/8-inch rod.
4. NPS 2-1/2: 11 feet with 1/2-inch rod.
5. NPS 3: 12 feet with 1/2-inch rod.
6. NPS 4 and NPS 5: 12 feet with 5/8-inch rod.

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I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect soil and waste piping to exterior sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.

C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.

3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.

D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

3.6 IDENTIFICATION

A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.

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2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.

2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.

3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.

4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.

6. Prepare reports for tests and required corrective action.

3.8 CLEANING AND PROTECTION

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A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, soil and waste piping shall be the following:

1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.

C. Aboveground, vent piping shall be the following:

1. Hubless, cast-iron soil pipe and fittings; CISPI hubless-piping couplings; and coupled joints.

D. Underground, soil, waste, and vent piping shall be the following:

1. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.

END OF SECTION 22 13 16

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SECTION 22 13 19 - SANITARY WASTE PIPING SPECIALTIES

GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Cleanouts.
2. Floor drains.
3. Trench drains.
4. Miscellaneous sanitary drainage piping specialties.
5. Grease interceptors.

B. Related Requirements:

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1. Section 221423 "Storm Drainage Piping Specialties" for storm drainage piping inside the building, drainage piping specialties, and drains.
2. Section 224300 "Medical Plumbing Fixtures" for plaster sink interceptors.
3. Section 334100 "Storm Utility Drainage Piping" for storm draining piping and piping specialties outside the building.

1.3 DEFINITIONS

A. ABS: Acrylonitrile-butadiene-styrene plastic.

B. FOG: Fats, oils, and greases.

C. HDPE: High-density polyethylene plastic.

1.4 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.5 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.6 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Soil, Waste, and Vent Piping: 10-foot head of water.

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B. Seismic Performance: Soil, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.7 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the

engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.8 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.9 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.10 PROTECTION

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A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.11 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be

neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.12 SUBMITTAL DATA

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and accessories for the following:

1. Grease interceptors.

B. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
c. Include all pertinent construction, installation, performance and technical data.
d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete

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layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

C. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

   a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

      1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled “SPECIFIED ITEM, NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

   b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

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2. It shall be the Contractor’s responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.13 INFORMATIONAL SUBMITTALS

A. Manufacturer Seismic Qualification Certification: Submit certification that grease interceptors, accessories, and components will withstand seismic forces defined in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

    a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
    b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.14 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

1.15 QUALITY ASSURANCE

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A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

1.16 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.17 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include

locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.18 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

1.19 COORDINATION

A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

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B. Coordinate size and location of roof penetrations.

1.20 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Cultures: Provide 1-gal. bottles of bacteria culture recommended by manufacturer of FOG disposal systems equal to 200 percent of amount installed, but no fewer than 2 1-gal. bottles.

PART 2 - PRODUCTS

2.1 CLEANOUTS

A. Exposed Metal Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Zurn

b. JR Smith
c. Watts

2. Standard: ASME A112.36.2M for cast iron for cleanout test tee.
3. Size: Same as connected drainage piping
4. Body Material: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Closure: Countersunk, brass plug.
6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

B. Metal Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Zurn
b. JR Smith
c. Watts

2. Standard: ASME A112.36.2M for cast-iron soil pipe with cast-iron ferrule threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Cast-iron soil pipe with cast-iron ferrule Threaded, adjustable housing.
5. Body or Ferrule: Cast iron.
6. Outlet Connection: Threaded.
7. Closure: Brass plug with tapered threads.
8. Adjustable Housing Material: Cast iron with set-screws or other device.
9. Frame and Cover Material and Finish: Nickel-bronze, copper alloy.
10. Frame and Cover Shape: Round.
11. Top Loading Classification: Heavy Duty.
12. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

C. Cast-Iron Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Zurn
b. JR Smith
c. Watts

2. Standard: ASME A112.36.2M. Include wall access.
3. Size: Same as connected drainage piping.
4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
5. Option for drilled-and-threaded plug in first subparagraph below is for a screw for a wall cover plate.
6. Closure: Countersunk, brass plug.
7. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
8. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.
9. Wall Access: stainless-steel wall-installation frame and cover.

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2.2 FLOOR DRAINS

A. Cast-Iron Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Zurn
    b. JR Smith
    c. Watts

3. Standard: ASME A112.6.3.
4. Pattern: Floor drain.
5. Body Material: Gray iron.
6. Seepage Flange: Required.
7. Anchor Flange: Required.
8. Clamping Device: Required.
9. Outlet: Bottom.
10. Coating in first subparagraph below is usually used only on sanitary floor drains.
11. Coating on Interior and Exposed Exterior Surfaces: Acid-resistant enamel.
12. Sediment Bucket: Not required.
13. Top or Strainer Material: Nickel bronze.
14. Top of Body and Strainer Finish: Nickel bronze.
15. Top Shape: Round.

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B. Stainless-Steel Floor Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Josam Company.

3. Standard: ASME A112.3.1.
4. Outlet: Bottom.
5. Top or Strainer Material: Stainless steel.
6. Top Shape: Round.
7. Trap-Primer Connection: Required.

2.3 TRENCH DRAINS

A. Trench Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Zurn
b. JR Smith
c. Watts

3. Standard: ASME A112.6.3 for trench drains.
4. Material: Ductile or gray iron.
5. Flange: Anchor.
6. Clamping Device: Required.
7. Outlet: Bottom.
8. Grate Material: Ductile iron.
9. Grate Finish: Painted.
10. Top Loading Classification: Medium Duty.

2.4 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES

A. Vent Caps:

1. Description: Cast-iron body with threaded or hub inlet and vandal-proof design. Include vented hood and setscrews to secure to vent pipe.
2. Size: Same as connected stack vent or vent stack.

2.5 SAND/OIL INTERCEPTORS

A. Sand/Oil Interceptors:

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1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Jensen Precast.

3. Standard: ASME A112.14.3 and PDI-G101, for intercepting and retaining fats, oils or -processing wastewater.
4. PDI certification is currently limited to 50-gpm (3.15-L/s) flow rate and 100-lb (45.4-kg) grease retention by PDI-G101. Larger uncertified units are available. PDI-G101 is being revised, should be available by end of 2003, and will include capacities to 100 gpm (6.3 L/s).
5. Plumbing and Drainage Institute Seal: Not required.
6. Rate in subparagraph below is limited to 100 gpm (6.3 L/s).
7. Capacity in first subparagraph below is limited to 200 lb (90.7 kg).
8. Sand/Oil Retention Capacity: 1000 Gallon.
9. Inlet and Outlet Size: 4”
10. Cleanout: Integral or field installed on outlet.
11. Mounting: Recessed, flush with floor.
12. Operation: Manual cleaning.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment Mounting:

1. Install grease interceptors on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 03 30 00 "Cast-in-Place Concrete." Section 03 30 53 "Miscellaneous Cast-in-Place Concrete."
2. Comply with requirements for vibration isolation and seismic control devices specified in Section 22 05 48 "Vibration and Seismic Controls for Plumbing Piping and Equipment"
3. Comply with requirements for vibration isolation devices specified in Section 22 05 48.13 "Vibration Controls for Plumbing Piping and Equipment."

B. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:

1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate at each change in direction of piping greater than 45 degrees.
3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
4. Locate at base of each vertical soil and waste stack.

C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

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D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

E. Install floor drains at low points of surface areas to be drained. Set grates of drains flush with finished floor, unless otherwise indicated.
1. Install floor-drain flashing collar or flange so no leakage occurs between drain and adjoining flooring. Maintain integrity of waterproof membranes where penetrated.
2. Install individual traps for floor drains connected to sanitary building drain, unless otherwise indicated.

F. Install trench drains at low points of surface areas to be drained. Set grates of drains flush with finished surface, unless otherwise indicated.

G. Install roof flashing assemblies on sanitary stack vents and vent stacks that extend through roof.

H. Install flashing fittings on sanitary stack vents and vent stacks that extend through roof.

I. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.

J. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.
1. Exception: Fitting may be omitted if trap has trap-seal primer connection.

2. Size: Same as floor drain inlet.

K. Install air-gap fittings on draining-type backflow preventers and on indirect-waste piping discharge into sanitary drainage system.

L. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.

M. Install vent caps on each vent pipe passing through roof.

N. Install frost-resistant vent terminals on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.

O. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.

P. Install frost-proof vent caps on each vent pipe passing through roof. Maintain 1-inch clearance between vent pipe and roof substrate.

Q. Install grease interceptors, venting according to authorities having jurisdiction and with clear space for servicing.
1. Flush with Floor Installation: Set unit and extension, if required, with cover flush with finished floor
2. Install cleanout immediately downstream from interceptors not having integral cleanout on outlet.

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R. Install wood-blocking reinforcement for wall-mounting-type specialties.

S. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

3.2 CONNECTIONS

A. Comply with requirements in Section 22 13 16 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Grease Interceptors: Connect inlet and outlet to unit, and connect flow-control fitting and vent to unit inlet piping. Install valve on outlet of automatic drawoff-type unit.

D. Ground equipment according to Section 26 05 26 "Grounding and Bonding for Electrical Systems."

E. Connect wiring according to Section 26 05 19 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
   1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
   2. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
   1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
   2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
   3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 07 62 00 "Sheet Metal Flashing and Trim."

F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.

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G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 LABELING AND IDENTIFYING

A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
   1. Grease interceptors.

B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 22 05 53 "Identification for Plumbing Piping and Equipment."

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

3.6 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain grease removal devices. Refer to Section 01 79 00 "Demonstration and Training."

END OF SECTION 22 13 19

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SECTION 22 14 13 - STORM DRAIN PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.
3. Encasement for underground metal piping.

B. Related Sections:

1. Section 221429 "Sump Pumps" for storm drainage pumps.
2. Section 334100 "Storm Utility Drainage Piping" for storm drainage piping outside the building.

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1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Storm Drainage Piping: 10-foot head of water.
2. Storm Drainage, Force-Main Piping: 150 psig.

B. Seismic Performance: Storm drainage piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

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C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 UTILITIES

A. See Drawings for Points of Connection.

B. Certain site utilities are to be connected to and extended. Before laying of any pipe or digging of any trenches, Contractor shall determine by actual excavation and measurement exact location and depth of lines to which he is to connect. In event depth of lines is not sufficient to permit connection in manner indicated, Contractor shall obtain direction from the Owner's representative before proceeding with this work.

C. Verify that utility companies size their services and meters to suit ultimate demand indicated on the drawings.

D. Storm Drain: The Contractor shall be responsible for the storm drain service outside of the building within five feet (5') of the foundation, and within the building itself. See Civil Engineer's plans for onsite storm drain system.

1.9 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

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1.10 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.11 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in

walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.12 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

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a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
c. Include all pertinent construction, installation, performance and technical data.
d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

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1.13 INFORMATIONAL SUBMITTALS

A. Seismic Qualification Certificates: For storm drainage piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.14 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping System Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic drain piping and "NSF-sewer" for plastic sewer piping.

1.15 PROJECT CONDITIONS

A. Interruption of Existing Storm-Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of storm-drainage service.
2. Do not proceed with interruption of storm-drainage service without Architect's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

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A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Storm Drain Piping:

1. Concealed storm drain piping within the building itself and outside within five feet (5') of the foundation, shall be no-hub cast iron pipe and fittings, asphaltum coated, free from defects, and shall comply with CISPI. Standard 301, ASTM A-888 or ASTM A-74. Pipe and fittings shall be marked with the collective trademark of the Cast Iron Soil Pipe Institute. Fittings shall be made up with "Husky" SD 4000 series or “Clamp All” HI-TORQ 125 series stainless steel type 304 couplings and shall conform to ASTM C 1540 & ASTM C564.
2. Exposed storm drain piping shall be Schedule 40 galvanized steel pipe, ASTM A53, with black cast iron recessed drainage fittings.

C. Sub-soil Drainage System:

1. Piping: PVC, SDR-35 perforated pipe with solid wall fittings and solvent-cemented joints. Perforations shall be 1/4" diameter on 3" centers, 120 degrees between two rows parallel to pipe axis. Install per pipe manufacturer's directions.

2.2 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS

A. Pipe and Fittings: ASTM A 888 or CISPI 301.

B. CISPI, Hubless-Piping Couplings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ANACO-Husky SD 4000 series.
b. Clamp All HI_TORQ 125 series.

2. Standards: ASTM C 1277 and CISPI 310.
3. Description: Stainless-steel corrugated shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

2.3 ENCASEMENT FOR UNDERGROUND METAL PIPING

A. Standard: ASTM A 674 or AWWA C105.

B. Material: High-density, crosslaminated PE film of 0.004-inch or LLDPE film of 0.008-inch minimum thickness.

C. Form: Tube.

D. Color: Black.

PART 3 - EXECUTION

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3.1 EARTH MOVING

A. Comply with requirements for excavating, trenching, and backfilling specified in Section 312000 "Earth Moving."

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations from layout are approved on coordination drawings.

B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

E. Install piping to permit valve servicing.

F. Install piping at indicated slopes.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping to allow application of insulation.

J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

K. Make changes in direction for storm drainage piping using appropriate branches, bends, and long-sweep bends. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.

L. Lay buried building storm drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.

M. Install storm drainage piping at the following minimum slopes unless otherwise indicated:

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1. Building Storm Drain: 1% downward in direction of flow for piping NPS 3 and smaller; 1% downward in direction of flow for piping NPS 4 and larger unless noted otherwise on drawings.
2. Horizontal Storm-Drainage Piping: 1% downward in direction of flow unless noted otherwise on drawings.

N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."

1. Install encasement on underground piping according to ASTM A 674 or AWWA C105.

O. Install steel piping according to applicable plumbing code.

P. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

Q. Install aboveground ABS piping according to ASTM D 2661.

R. Install aboveground PVC piping according to ASTM D 2665.

S. Install engineered siphonic drain specialties and storm drainage piping in locations indicated.

T. Install underground, ductile-iron, force-main piping according to AWWA C600. Install buried piping inside building between wall and floor penetrations and connection to storm sewer piping outside building with restrained joints. Anchor pipe to wall or floor. Install thrust-block supports at vertical and horizontal offsets.

1. Install encasement on piping according to ASTM A 674 or AWWA C105.

U. Install underground, copper, force-main tubing according to CDA's "Copper Tube Handbook."

1. Install encasement on piping according to ASTM A 674 or AWWA C105.

V. Install force mains at elevations indicated.

W. Plumbing Specialties:

1. Install backwater valves in storm drainage gravity-flow piping. Comply with requirements for backwater valves specified in Section 221423 "Storm Drainage Piping Specialties."
2. Install cleanouts at grade and extend to where building storm drains connect to building storm sewers in storm drainage gravity-flow piping. Install cleanout fitting with closure plug inside the building in storm drainage force-main piping. Comply with requirements for cleanouts specified in Section 221423 "Storm Drainage Piping Specialties."
3. Install drains in storm drainage gravity-flow piping. Comply with requirements for drains specified in Section 221423 "Storm Drainage Piping Specialties."

X. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

Y. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

Z. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

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AA. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.3 JOINT CONSTRUCTION

A. Hub-and-Spigot, Cast-Iron Soil Piping Gasketed Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Hub-and-Spigot, Cast-Iron Soil Piping Calked Joints: Join according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum calked joints.

C. Hubless, Cast-Iron Soil Piping Coupled Joints: Join according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Join copper tube and fittings with soldered joints according to ASTM B 828 procedure. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

F. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fittings. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.

G. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

H. Plastic, Nonpressure-Piping, Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:

1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
2. .

3.4 VALVE INSTALLATION

A. General valve installation requirements are specified in Section 220523 "General-Duty Valves for Plumbing Piping."

B. Shutoff Valves: Install shutoff valve on each sump pump discharge.

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1. Install gate or full-port ball valve for piping NPS 2 and smaller.
2. Install gate valve for piping NPS 2-1/2 and larger.

C. Check Valves: Install swing-check valve, between pump and shutoff valve, on each sump pump discharge.

D. Backwater Valves: Install backwater valves in piping subject to backflow.

1. Horizontal Piping: Horizontal backwater valves. Use normally closed type unless otherwise indicated.
2. Install backwater valves in accessible locations.
3. Comply with requirements for backwater valves specified in Section 221423 "Storm Drainage Piping Specialties."

3.5 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
2. Install stainless-steel pipe hangers for horizontal piping in corrosive environments.
3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.

4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Individual, Straight, Horizontal Piping Runs:

    a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support horizontal piping and tubing within 12 inches of each fitting, valve, and coupling.

D. Support vertical piping and tubing at base and at each floor.

E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
2. NPS 3: 60 inches with 1/2-inch rod.
3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
4. NPS 6 and NPS 8: 60 inches with 3/4-inch rod.
5. NPS 10 and NPS 12: 60 inches with 7/8-inch rod.
6. Spacing for 10-foot pipe lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.

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G. Install supports for vertical cast-iron soil piping every 15 feet.

H. Install supports for vertical copper tubing every 10 feet.

I. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.6 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect interior storm drainage piping to exterior storm drainage piping. Use transition fitting to join dissimilar piping materials.

C. Connect storm drainage piping to roof drains and storm drainage specialties.

1. Install test tees (wall cleanouts) in conductors near floor, and floor cleanouts with cover flush with floor.
2. Install horizontal backwater valves with cleanout cover flush with floor.
3. Comply with requirements for backwater valves cleanouts and drains specified in Section 221423 "Storm Drainage Piping Specialties."

D. Connect force-main piping to the following:

1. Storm Sewer: To exterior force main.
2. Sump Pumps: To sump pump discharge.

E. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

F. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

3.7 IDENTIFICATION

A. Identify exposed storm drainage piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.8 FIELD QUALITY CONTROL

A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.

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1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in.
2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.

B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

D. Test storm drainage piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
2. Leave uncovered and unconcealed new, altered, extended, or replaced storm drainage piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
3. Test Procedure: Test storm drainage piping on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts until completion of inspection, water level must not drop. Inspect joints for leaks.

4. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
5. Prepare reports for tests and required corrective action.

E. Test force-main piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:

1. Leave uncovered and unconcealed new, altered, extended, or replaced force-main piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
2. Cap and subject piping to static-water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
3. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
4. Prepare reports for tests and required corrective action.

3.9 CLEANING

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

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C. Place plugs in ends of uncompleted piping at end of day and when work stops.

END OF SECTION 22 14 13

SECTION 22 14 23 - STORM DRAIN PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Roof drains.
2. Miscellaneous storm drainage piping specialties.
3. Cleanouts.
4. Flashing materials.

1.3 WORK INCLUDED

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A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Storm Drainage Piping: 10-foot head of water.
2. Storm Drainage, Force-Main Piping: 150 psig.

B. Seismic Performance: Storm drainage piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

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C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.9 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.10 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

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B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.11 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each

submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.

2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

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b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.12 INFORMATIONAL SUBMITTALS

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A. Seismic Qualification Certificates: For storm drainage piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.13 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping System Components and Related Materials," for plastic piping components. Include marking with "NSF-drain" for plastic drain piping and "NSF-sewer" for plastic sewer piping.

1.14 PROJECT CONDITIONS

A. Interruption of Existing Storm-Drainage Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of storm-drainage service.
2. Do not proceed with interruption of storm-drainage service without Architect's written permission.

B. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.

C. Fasteners: Metal compatible with material and substrate being fastened.

D. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

E. Solder: ASTM B 32, lead-free alloy.

PART 2 - PRODUCTS

2.1 METAL ROOF DRAINS

A. Cast-Iron, Large-Sump, General-Purpose Roof Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

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   a. Zurn
   b. JR Smith
   c. Watts

3. Standard: ASME A112.6.4, for general-purpose roof drains.
4. Body Material: Cast iron.
5. Dimension of Body: Nominal 15-inch diameter.
6. Combination Flashing Ring and Gravel Stop: Required.
7. Outlet: Bottom.
8. Extension Collars: Required.
9. Underdeck Clamp: Required.
10. Sump Receiver Plate: Required.
11. Dome Material: Cast iron.
12. Perforated Gravel Guard: Stainless steel.
13. Vandal-Proof Dome: Required.
14. Overflow Drain Water Dam: 2 inches.

2.2 MISCELLANEOUS STORM DRAINAGE PIPING SPECIALTIES

A. Downspout Adaptors:

1. Description: Manufactured, gray-iron casting, for attaching to horizontal-outlet, parapet roof drain and to exterior, sheet metal downspout.
2. Size: Inlet size to match parapet drain outlet.

B. Downspout Boots:

1. Description: Manufactured, ASTM A 48/A 48M, gray-iron casting, with strap or ears for attaching to building; NPS 4 (DN 100) outlet; and shop-applied bituminous coating.
2. Size: Inlet size to match downspout and NPS 4 (DN 100) outlet.

C. Conductor Nozzles:

1. Description: Bronze body with threaded inlet and bronze wall flange with mounting holes.
2. Size: Same as connected conductor.

2.3 CLEANOUTS

A. Floor Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

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a. Zurn
b. JR Smith
c. Watts.

3. Standard: ASME A112.36.2M, for adjustable housing cleanouts.
4. Size: Same as connected branch.
5. Type: Adjustable housing.
6. Body or Ferrule Material: Cast iron.
7. Clamping Device Required.
8. Outlet Connection: Spigot.
9. Closure: Cast-iron plug.
10. Adjustable Housing Material: Cast iron with threads
11. Frame and Cover Material and Finish: Stainless steel.
12. Frame and Cover Shape: Round.
13. Top-Loading Classification: Heavy Duty.
14. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.

B. Test Tees:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Zurn

b. JR Smith
c. Watts

3. Standard: ASME A112.36.2M and ASTM A 74, ASTM A 888, or CISPI 301, for cleanout test tees.
4. Size: Same as connected drainage piping.
5. Body Material: Hub-and-spigot, cast-iron soil-pipe T-branch or hubless, cast-iron soil-pipe test tee as required to match connected piping.
6. Closure Plug: Countersunk.
7. Closure Plug Size: Same as or not more than one size smaller than cleanout size.

C. Wall Cleanouts:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Zurn
b. JR Smith.
c. Watts

3. Standard: ASME A112.36.2M, for cleanouts. Include wall access.
4. Size: Same as connected drainage piping.
5. Body Material Hubless, cast-iron soil-pipe test tee as required to match connected piping.
6. Closure: Countersunk or raised-head cast-iron plug.
7. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
8. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.
9. Wall Access: Round stainless-steel wall-installation frame and cover.

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2.4 TRENCH DRAINS

A. Trench Drains:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Z
b. JR Smith
c. Watts

3. Standard: ASME A112.6.3, for trench drains.
4. Body Material: Cast iron.
5. Flange: Anchor with weep holes as required.
6. Clamping Device: Refer to Plumbing Fixture Schedule.
7. Outlet: Bottom.
8. Grate Material: See to Plumbing Fixture Schedule.
9. Grate Finish: See to Plumbing Fixture Schedule.

10. Dimensions of Frame and Grate: See Plumbing Fixture Schedule.
11. Top-Loading Classification: Heavy Duty.

2.5 THROUGH-PENETRATION FIRESTOP ASSEMBLIES

A. Through-Penetration Firestop Assemblies:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. ProSet Systems Inc.

3. Standard: ASTM E 814, for through-penetration firestop assemblies.
4. Certification and Listing: Intertek Testing Service NA for through-penetration firestop assemblies.
5. Size: Same as connected pipe.
6. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
7. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
8. Special Coating: Corrosion resistant on interior of fittings.

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2.6 FLASHING MATERIALS

A. Copper Sheet: ASTM B 152/B 152M,12 oz./sq. ft.

B. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch minimum thickness unless otherwise indicated. Include G90 hot-dip galvanized, mill-phosphatized finish for painting if indicated.

C. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.

D. Fasteners: Metal compatible with material and substrate being fastened.

E. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.

F. Solder: ASTM B 32, lead-free alloy.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install roof drains at low points of roof areas according to roof membrane manufacturer's written installation instructions.

1. Install flashing collar or flange of roof drain to prevent leakage between drain and adjoining roofing. Maintain integrity of waterproof membranes where penetrated.
2. Install expansion joints, if indicated, in roof drain outlets.
3. Position roof drains for easy access and maintenance.

B. Install cleanouts in aboveground piping and building drain piping according to the following instructions unless otherwise indicated:

1. Use cleanouts the same size as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
2. Locate cleanouts at each change in direction of piping greater than 45 degrees.
3. Locate cleanouts at base of each vertical soil and waste stack.

C. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.

D. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.

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E. Install test tees in vertical conductors and near floor.

F. Install wall cleanouts in vertical conductors. Install access door in wall if indicated.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 221413 "Facility Storm Drainage Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

3.3 FLASHING INSTALLATION

A. Fabricate flashing from single piece of metal unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:

1. Lead Sheets: Burn joints of 6.0-lb/sq. ft. lead sheets, 0.0938-inch thickness or thicker. Solder joints of 4.0-lb/sq. ft. lead sheets, 0.0625-inch thickness or thinner.
2. Copper Sheets: Solder joints of copper sheets.

B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.

1. Pipe Flashing: Sleeve type, matching the pipe size, with a minimum length of 10 inches and with skirt or flange extending at least 8 inches around pipe.

2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.

C. Set flashing on floors and roofs in solid coating of bituminous cement.

D. Secure flashing into sleeve and specialty clamping ring or device.

E. Fabricate and install flashing and pans, sumps, and other drainage shapes.

3.4 PROTECTION

A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.

B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

END OF SECTION 22 14 23

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SECTION 22 16 16 - CONDENSATE DRAIN PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Pipe, tube, and fittings.
2. Specialty pipe fittings.

B. Related Sections:

1. Section 221619 “Condensate Drain Piping Specialties" for sanitary sewerage piping and structures outside the building.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 PERFORMANCE REQUIREMENTS

A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:

1. Single-Wall Piping Pressure Rating: 10-foot head of water.

A. Delegated Design: Design seismic restraints for aboveground piping, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

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C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.9 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.10 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

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B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.11 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each

submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.

2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

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b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.

1.12 INFORMATIONAL SUBMITTALS

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A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.

B. Field quality-control reports.

1.13 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

B. Comply with NSF/ANSI 14, "Plastics Piping Systems Components and Related Materials," for plastic piping components. Include marking with "NSF-dwv" for plastic drain, waste, and vent piping and "NSF-sewer" for plastic sewer piping.

1.14 PROJECT CONDITIONS

A. Interruption of Existing Sanitary Waste Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary service according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of sanitary waste service.

2. Do not proceed with interruption of sanitary waste service without Architect's written permission.

1.15 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.16 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

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1.17 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

B. Indirect Waste Piping.

1. Shall be Type "L" copper as specified for water piping.

C. Air Conditioning Condensate Drain Piping.

1. Shall be Type "M" copper as specified for water piping.

2.2 COPPER TUBE AND FITTINGS:

A. Hard Copper Tube: ASTM B 88, Type M tube, drawn temper.

B. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.

C. Copper Unions:

1. MSS SP-123.
2. Cast-copper-alloy, hexagonal-stock body.
3. Ball-and-socket, metal-to-metal seating surfaces.
4. Solder-joint or threaded ends

2.3 SPECIALTY PIPE FITTINGS

A. Dielectric Fittings:

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1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Dielectric Unions:

a. Manufacturers: Subject to compliance with requirements, provide products by the following:

1) Wilkins; a Zurn company.

b. Description:

1) Standard: ASSE 1079.
2) Pressure Rating: 150 psig.
3) End Connections: Solder-joint copper alloy and threaded ferrous.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of condensate drain piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.

B. Install condensate drain piping with 1 percent slope downward toward drain.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping at indicated slopes.

G. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Install unions in copper tubing at connection to each piece of equipment, machine, and specialty.

L. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

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M. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."

N. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

O. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

P. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

Q. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

3.2 JOINT CONSTRUCTION

A. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.

2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

B. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

3.3 SPECIALTY PIPE FITTING INSTALLATION

A. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."

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1. Vertical Piping: MSS Type 8 or 42, clamps.
2. Individual, Straight, Horizontal Piping Runs:

   a. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet (30 m): MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Feet (30 m) if Indicated: MSS Type 49, spring cushion rolls.

3. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
4. Base of Vertical Piping: MSS Type 52, spring hangers
5. Vertical Piping: MSS Type 8 or Type 42, clamps.
6. Install individual, straight, horizontal piping runs:

   a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
   b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
   c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.

7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
8. Base of Vertical Piping: MSS Type 52, spring hangers.

C. Support vertical piping and tubing at base and at each floor.

D. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.

E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:

1. NPS 1-1/4 and Smaller: 72 inches with 3/8-inch rod.

2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.

F. Install supports for vertical copper tubing every 10 feet.

G. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

3.5 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect drainage and vent piping to the following:

1. Plumbing Specialties: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.

2. Install test tees (wall cleanouts) in conductors near floor.

3. Equipment: Connect drainage piping as indicated. Provide union for each connection.

C. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.

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D. Make connections according to the following unless otherwise indicated:

1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.

3.6 IDENTIFICATION

A. Identify exposed condensate drain piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL

A. Perform the following tests and inspections:

1. Piping Inspections:

a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:

1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.

2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.

c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

2. Piping Tests:

a. Fill condensate drain piping. Check components to determine that they are not air bound and that piping is full of water.
b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
d. Cap and subject piping to static water pressure of 50 psig. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
f. Prepare reports for tests and for corrective action required.

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B. Condensate drain piping will be considered defective if it does not pass tests and inspections

C. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.

D. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.

3.8 CLEANING AND PROTECTION

A. Clean interior of piping. Remove dirt and debris as work progresses.

B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.

C. Place plugs in ends of uncompleted piping at end of day and when work stops.

3.9 PIPING SCHEDULE

A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.

B. Aboveground, condensate drain piping NPS 2 and smaller, shall be the following:

1. Hard copper tube, ASTM B 88, Type M copper, soilder-joint fittings; and soldered joints.

END OF SECTION 22 16 16

SECTION 22 33 00 - ELECTRIC DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Commercial, electric, storage, domestic-water heaters.
2. Domestic-water heater accessories.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

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1.4 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.5 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California Division of the State Architect.
6. California State Division of Industrial Safety.
7. County Health Department.
8. Any other legally constituted body-having jurisdiction thereof.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.6 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

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D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.7 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.8 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.9 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.10 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

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C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.11 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

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1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.12 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

1.13 QUALITY ASSURANCE

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A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE/IESNA Compliance: Fabricate and label fuel-fired, domestic-water heaters to comply with ASHRAE/IESNA 90.1.

C. ASME Compliance:

1. Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

1.14 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided.

1.15 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.16 WARRANTY

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fuel-fired, domestic-water heaters that fail in materials or workmanship within specified warranty period.

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1. Failures include, but are not limited to, the following:

   a. Structural failures including storage tank and supports.
   b. Faulty operation of controls.
   c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion.

   a. Commercial, Gas-Fired, Storage, Domestic-Water Heaters:

      1) Storage Tank: Five years.
      2) Controls and Other Components: Two years.

   b. Compression Tanks: Five years.
   c.

PART 2 - PRODUCTS

2.1 COMMERCIAL, ELECTRIC, domestic-WATER HEATERS

A. Commercial, Electric, Storage, Domestic-Water Heaters:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AO Smith
b. Bradford White
c. Rheem

2. Standard: UL 1453.

3. Factory-Installed Storage-Tank Appurtenances:

a. Anode Rod: Replaceable magnesium.
b. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
c. Insulation: Comply with ASHRAE/IESNA 90.1.
d. Jacket: Steel with enameled finish.
e. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.
f. Temperature Control: Adjustable thermostat.
g. Safety Controls: High-temperature-limit and low-water cutoff devices or systems.
h. Relief Valves: ASME rated and stamped for combination temperature-and-pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.

4. Special Requirements: NSF 5 construction.

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2.2 domestic-WATER HEATER ACCESSORIES

A. Domestic-Water Compression Tanks:

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. AMTROL Inc.
b. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
c. Taco, Inc.

2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:

a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
c. Air-Charging Valve: Factory installed.

B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.

C. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.

D. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.

E. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.

F. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.

G. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include dimension that will support bottom of domestic-water heater a minimum of 18 inches above the floor.

H. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

2.3 SOURCE QUALITY CONTROL

A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.

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C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

D. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 033000 "Cast-in-Place Concrete."

1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
2. Maintain manufacturer's recommended clearances.
3. Arrange units so controls and devices that require servicing are accessible.
4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.

5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
7. Install anchor bolts to elevations required for proper attachment to supported equipment.
8. Anchor domestic-water heaters to substrate.

B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."

C. Install commercial, electric, domestic-water heaters with seismic-restraint devices. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

D. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

E. Install combination temperature-and-pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

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F. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."

G. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

H. Install thermometers on inlet and outlet piping of residential, solar, electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

I. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified in Section 220523 "General-Duty Valves for Plumbing Piping," and comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."

J. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.

K. Fill electric, domestic-water heaters with water.

L. Charge domestic-water compression tanks with air.

3.2 CONNECTIONS

A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

3.3 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

3.4 FIELD QUALITY CONTROL

A. Perform tests and inspections.

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1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.

C. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial, electric, domestic-water heaters.

END OF SECTION 22 33 00

SECTION 22 42 13.13 - COMMERCIAL WATER CLOSETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Water closets.
2. Flushometer valves.
3. Toilet seats.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.
8. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3.
9. Access plumbing fixtures shall comply with all of the requirements of CBC Division 6.
10. Clearance around accessible water closets and in toilet compartments shall be 60 inches minimum measured perpendicular from the side wall and 56 inches minimum measured perpendicular from the rear wall per CBC Section 11B-604.3.1.
11. Heights and location of all fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.

12. Accessible fixture controls shall comply with CBC Sections 11B-604.6 for water closets and 11B-604.9.5 for children's water closets.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

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D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

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C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.

4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

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1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.

3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than six of each type.

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1.12 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.13 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.14 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 Equipment and Fixtures:

A. Fixtures:

1. See schedule on drawings.

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2.2 FLOOR-MOUNTED, BOTTOM-OUTLET WATER CLOSETS

A. Water Closets: Floor mounted, bottom outlet, top spud.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. American Standard America.
b. Kohler Co.

3. Bowl:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
b. Material: Vitreous china.
c. Type: Siphon jet.
d. Style: Flushometer valve.
e. Height: Standard.
f. Rim Contour: Elongated.
g. Water Consumption: 1.28 gal. (4.8 L) per flush.
h. Spud Size and Location: NPS 1-1/2 (DN 40); top.

2.3 FLUSHOMETER VALVES

A. Lever-Handle, Diaphragm Flushometer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Sloan Valve Company.

3. Standard: ASSE 1037.
4. Minimum Pressure Rating: 125 psig (860 kPa).
5. Features: Include integral check stop and backflow-prevention device.
6. Material: Brass body with corrosion-resistant components.
7. Exposed Flushometer-Valve Finish: Chrome plated.
8. Panel Finish: Chrome plated or stainless steel.
9. Style: Exposed.
10. Consumption: 1.28 gal. (4.8 L) per flush.
11. Minimum Inlet: NPS 1 (DN 25).
12. Minimum Outlet: NPS 1-1/4 (DN 32).

2.4 TOILET SEATS

A. Toilet Seats:

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1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Bemis Manufacturing Company.
    b. Olsonite Seat Co.

3. Standard: IAPMO/ANSI Z124.5.
4. Material: Plastic.
5. Type: Commercial (Standard).
6. Shape: Elongated rim, open front.
7. Hinge: Self-sustaining, check.
8. Hinge Material: Noncorroding metal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

3.2 INSTALLATION

A. Water-Closet Installation:

1. Install level and plumb according to roughing-in drawings.
2. Install accessible, wall-mounted water closets at mounting height for handicapped/elderly, according to ICC/ANSI A117.1.

B. Flushometer-Valve Installation:

1. Install flushometer-valve, water-supply fitting on each supply to each water closet.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible water closets with handle mounted on open side of water closet.

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C. Install toilet seats on water closets.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations and within cabinets and millwork.
2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between water closets and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to water-closet color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect water closets with water supplies and soil, waste, and vent piping. Use size fittings required to match water closets.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to water closets, allow space for service and maintenance.

3.4 ADJUSTING

A. Operate and adjust water closets and controls. Replace damaged and malfunctioning water closets, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

C. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

3.5 CLEANING AND PROTECTION

A. Clean water closets and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed water closets and fittings.

C. Do not allow use of water closets for temporary facilities unless approved in writing by Owner.

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3.6 PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Division 6.

B. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.

C. Fixture controls shall comply with CBC Sections 11B-604.6 for water closets

END OF SECTION 22 42 13.13

SECTION 22 42 13.16 - COMMERCIAL URINALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Urinals.
2. Flushometer valves.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.
8. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3.
9. Access plumbing fixtures shall comply with all of the requirements of CBC Division 6.
10. Heights and location of all fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
11. Accessible fixture controls shall comply with CBC Sections 11B-605.4 for urinals.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

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1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.10 SUBMITTAL DATA

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A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled “SPECIFIED ITEM, NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

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b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor’s responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

1. Flushometer-Valve Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than six of each type.

1.12 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.13 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

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1.14 GUARANTEES (Also see General Conditions)

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND FIXTURES:

A. Fixtures:
1. See schedule on drawings.

2.2 WALL-HUNG URINALS

A. Urinals: Floor mounted, back outlet, washout.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. American Standard
b. Kohler Co.

3. Fixture:

a. Standards: ASME A112.19.2/CSA B45.1 and ASME A112.19.5.
b. Material: Vitreous china.
c. Type: Washout.
d. Strainer or Trapway: Manufacturer's standard strainer with integral trap.
e. Water Consumption: Water saving.
f. Spud Size and Location: NPS 3/4 (DN 20); top.
g. Outlet Size and Location: NPS 2 (DN 50); back.
h. Color: White.

4. Waste Fitting:

a. Standard: ASME A112.18.2/CSA B125.2 for coupling.
b. Size: NPS 2 (DN 50).

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5. Support: ASME A112.6.1M, Type I, urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture. Include rectangular, steel uprights.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
b. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

1) ZURN CARRIERS

2.3 URINAL FLUSHOMETER VALVES

A. Lever-Handle, Diaphragm Flushometer Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Sloan Valve Company.

3. Standard: ASSE 1037.
4. Minimum Pressure Rating: 125 psig (860 kPa).
5. Features: Include integral check stop and backflow-prevention device.
6. Material: Brass body with corrosion-resistant components.

7. Exposed Flushometer-Valve Finish: Chrome plated.
8. Panel Finish: Chrome plated or stainless steel.
9. Style: Exposed.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

3.2 INSTALLATION

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A. Urinal Installation:

1. Install urinals level and plumb according to roughing-in drawings.
2. Install wall-hung, back-outlet urinals onto waste fitting seals and attached to supports.
3. Install wall-hung, bottom-outlet urinals with tubular waste piping attached to supports.
4. Install accessible, wall-mounted urinals at mounting height for the handicapped/elderly, according to ICC/ANSI A117.1.

B. Support Installation:

1. Install supports, affixed to building substrate, for wall-hung urinals.
2. Use off-floor carriers with waste fitting and seal for back-outlet urinals.
3. Use carriers without waste fitting for urinals with tubular waste piping.
4. Use chair-type carrier supports with rectangular steel uprights for accessible urinals.

C. Flushometer-Valve Installation:

1. Install flushometer-valve water-supply fitting on each supply to each urinal.
2. Attach supply piping to supports or substrate within pipe spaces behind fixtures.
3. Install lever-handle flushometer valves for accessible urinals with handle mounted on open side of compartment.
4. Install fresh batteries in battery-powered, electronic-sensor mechanisms.

D. Wall Flange and Escutcheon Installation:

1. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations.

2. Install deep-pattern escutcheons if required to conceal protruding fittings.
3. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Joint Sealing:

1. Seal joints between urinals and walls and floors using sanitary-type, one-part, mildew-resistant silicone sealant.
2. Match sealant color to urinal color.
3. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect urinals with water supplies and soil, waste, and vent piping. Use size fittings required to match urinals.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

D. Where installing piping adjacent to urinals, allow space for service and maintenance.

3.4 ADJUSTING

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A. Operate and adjust urinals and controls. Replace damaged and malfunctioning urinals, fittings, and controls.

B. Adjust water pressure at flushometer valves to produce proper flow.

3.5 CLEANING AND PROTECTION

A. Clean urinals and fittings with manufacturers' recommended cleaning methods and materials.

B. Install protective covering for installed urinals and fittings.

C. Do not allow use of urinals for temporary facilities unless approved in writing by Owner.

3.6 Completion of Installation:

A. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.

B. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.

C. Clean all piping, valves, traps, water heaters, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

3.7 PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Division 6.

B. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.

C. Fixture controls shall comply with CBC Sections 11B-605.4 for urinals.

END OF SECTION 22 42 13 16

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SECTION 22 42 16.13 - COMMERCIAL LAVATORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Lavatories.
2. Faucets.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.
8. Plumbing fixtures and accessories provided in a toilet room or bathing room required to comply with CBC Section 11B-213.2 shall comply with CBC Section 11B-213.3.
9. Access plumbing fixtures shall comply with all of the requirements of CBC Division 6.
10. Heights and location of all fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
11. Accessible fixture controls shall comply with CBC Sections 11B-611.3 for lavatories and sinks.
12. Accessible lavatories and sinks shall be mounted with the front of the higher of the rim or counter surface 34” maximum above the finish floor or ground. Depth of lavatories or

sinks shall not interfere with knee an toe clearance provided in accordance with CBC 11B-306 when forward approach is required CBC Sections 11B-606.3 and 11B606.7.

13. Water supply and drain pipes under accessible lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under accessible lavatories or sinks. CBC Section 11B-606.5.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

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C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of

submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

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B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division

except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.

3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

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B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

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1.12 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.13 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.14 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 Equipment and Fixtures:

A. Fixtures:

1. See schedule on drawings.

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2.2 VITREOUS-CHINA, WALL-MOUNTED LAVATORIES

A. Lavatory: Vitreous china, wall mounted, with back.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. American Standard America.
b. Kohler Co.

2. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: For wall hanging.
c. Faucet-Hole Location: Top.
d. Color: White.
e. Mounting Material: Chair carrier.

3. Support: ASME A112.6.1M, Type II, concealed-arm lavatory carrier.

2.3 VITREOUS-CHINA, UNDERCOUNTER-MOUNTED LAVATORIES

A. Lavatory: Vitreous china, under-counter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. American Standard America.
    b. Kohler Co.

3. Fixture:

    a. Standard: ASME A112.19.2/CSA B45.1.
    b. Type: For deck mounted.
    c. Faucet-Hole Location: Counter.
    d. Color: White.
    e. Mounting Material: Manufacturers recommended installation.

2.4 SOLID-BRASS, MANUALLY OPERATED FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet materials that will be in contact with potable water.

B. Lavatory Faucets: Manual-type, single-control mixing, commercial, solid-brass valve.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Chicago Faucets.

3. Standard: ASME A112.18.1/CSA B125.1.
4. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and fixture receptor.
5. Body Material: Commercial, solid brass.
6. Finish: Polished chrome plate.
7. Mounting Type: Deck, exposed.

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2.5 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated-brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated-brass or stainless-steel wall flange.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Chicago

D. Supply Stops: Chrome-plated-brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Chicago

E. Operation: Loose key.

F. Risers:

1. NPS 3/8.
2. Chrome-plated, rigid-copper-pipe and brass straight or offset tailpieces riser.

PART 3 - EXECUTION

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3.1 EXAMINATION

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

3.2 INSTALLATION

A. Install lavatories level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-mounted lavatories.

C. Install accessible wall-mounted lavatories at handicapped/elderly mounting height for people with disabilities or the elderly, according to ICC/ANSI A117.1.

D. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

E. Seal joints between lavatories, counters, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

F. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible lavatories. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

G. Point of use mixing valve in cabinet to be recessed in wall, under lavatory.

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

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3.4 ADJUSTING

A. Operate and adjust lavatories and controls. Replace damaged and malfunctioning lavatories, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of lavatories, inspect and repair damaged finishes.

B. Clean lavatories, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

C. Provide protective covering for installed lavatories and fittings.

D. Do not allow use of lavatories for temporary facilities unless approved in writing by Owner.

3.6 PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Division 6.

B. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.

C. Fixture controls shall comply with CBC Sections 11B-606.4 for lavatories and sinks.

D. Accessible sinks shall be 6-1/2" deep maximum. Sinks shall be mounted with front of the higher of the rim and counter surface 34" maximum above the finish floor or ground.

E. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks. CBC Section 11B-606.

END OF SECTION 22 42 16.13

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SECTION 22 42 16.16 - COMMERCIAL SINKS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Classroom Sinks
2. Sinks
3. Service sinks.
4. Sink faucets.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

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1.4 QUALITY ASSURANCE

A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California State Division of Industrial Safety.
6. County Health Department.
7. Any other legally constituted body-having jurisdiction thereof.
8. Access plumbing fixtures shall comply with all of the requirements of CBC Division 6.
9. Heights and location of all fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
10. Accessible fixture controls shall comply with CBC Sections 11B-611.3 for lavatories and sinks.
11. Accessible lavatories and sinks shall be mounted with the front of the higher of the rim or counter surface 34” maximum above the finish floor or ground. Depth of lavatories or sinks shall not interfere with knee an toe clearance provided in accordance with CBC 11B-306 when forward approach is required CBC Sections 11B-606.3 and 11B606.7.

12. Water supply and drain pipes under accessible lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under accessible lavatories or sinks. CBC Section 11B-606.5.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

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D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to

have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

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C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division

except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.

3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.
    b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
    c. Include all pertinent construction, installation, performance and technical data.
    d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

        1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
        2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

    e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

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B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

    a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

        1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled "SPECIFIED ITEM, NOT SUBMITTED". Product data sheets for the corresponding proposed substitution item shall be clearly labeled "PROPOSED SUBSTITUTION".

    b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor's responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.
5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are packaged with protective covering for storage and identified with labels describing contents.

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1.12 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.13 RECORD DRAWINGS

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.14 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 Equipment and Fixtures:

A. Fixtures:

1. See schedule on drawings.

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2.2 SINKS

A. Utility Sinks: Stainless steel, counter mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Elkay Manufacturing Co.
b. Just Manufacturing.

3. Fixture:

a. Standard: ASME A112.19.3/CSA B45.4.
b. Type: Ledge back.
c. Number of Compartments: One
d. Overall Dimensions: 22 by 19 inches
e. Metal Thickness: 0.050 inch
f. Compartment:

1) Dimensions: See Plumbing Fixture Schedule
2) Drain: Grid with NPS 1-1/2 tailpiece with stopper
3) Drain Location: Centered in compartment.

4. Faucet(s): See Plumbing Fixture Schedule

a. Number Required: One.
b. Mounting: On ledge.

2.3 VITREOUS-CHINA, WALL-MOUNTED HAND SINKS

A. Lavatory: Vitreous china, wall mounted, with back.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. American Standard America.
b. Kohler Co.

3. Fixture:

a. Standard: ASME A112.19.2/CSA B45.1.
b. Type: For wall hanging.
c. Faucet-Hole Location: Top.
d. Color: White.
e. Mounting Material: Chair carrier.

4. Support: ASME A112.6.1M, Type II, concealed-arm lavatory carrier.

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2.4 SERVICE SINKS

A. Service Sinks: Enameled, cast iron, floor mounted.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Commercial Enameling Company (CECO).
b. American Standard America.
c. Kohler Co.

3. Fixture:

a. Standard: ASME A112.19.1/CSA B45.2.
b. Style: With front apron and raised back.
c. Nominal Size: 28 by 28 inches.
d. Color: White.
e. Drain: Grid with NPS 3 outlet.
f. Rim Guard: Coated wire.

2.5 SINK FAUCETS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for faucet-spout materials that will be in contact with potable water.

B. Sink Faucets: Manual Type, Push Button.

1. Commercial, Solid-Brass Faucets.

a. Manufacturers: Subject to compliance with requirements, provide products by the following:
b. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following

1) Chicago Faucets.

2. Standard: ASME A112.18.1/CSA B125.1.
3. General: Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture hole punchings; coordinate outlet with spout and sink receptor.
4. Body Material: Commercial, solid brass.
5. Finish: Chrome plated.
6. Maximum Flow Rate:

a. Sinks: 1.8 gpm.
b. Service Sinks: - gpm

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7. Mounting Type: Back/wall, exposed.
8. Vacuum Breaker: Required for hose outlet.
9. Spout Outlet: Hose thread according to ASME B1.20.7.

2.6 SUPPLY FITTINGS

A. NSF Standard: Comply with NSF/ANSI 61, "Drinking Water System Components - Health Effects," for supply-fitting materials that will be in contact with potable water.

B. Standard: ASME A112.18.1/CSA B125.1.

C. Supply Piping: Chrome-plated brass pipe or chrome-plated copper tube matching water-supply piping size. Include chrome-plated brass or stainless-steel wall flange.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

a. Chicago

D. Supply Stops: Chrome-plated brass, one-quarter-turn, ball-type or compression valve with inlet connection matching supply piping.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. Chicago

E. Operation: Loose Key.

2.7 SINK WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 1-1/2 offset and straight tailpiece.

C. Trap:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
2. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

    a. McGuire MFG.

3. Size: NPS 1-1/2.
4. Material: Chrome-plated, seamless prewrapped cast-brass trap and swivel elbow, and chrome-plated brass or steel wall flange.

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2.8 SERVICE SINK WASTE FITTINGS

A. Standard: ASME A112.18.2/CSA B125.2.

B. Drain: Grid type with NPS 3 offset and straight tailpiece.

C. Trap:

1. Size: NPS 3.
2. Material: Flat Chrome strainer, cast-brass trap and swivel elbow.

2.9 GROUT

A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

B. Characteristics: Nonshrink; recommended for interior and exterior applications.

C. Design Mix: 5000-psi, 28-day compressive strength.

D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Locations and Accessibility: Install equipment for ease of maintenance and repair. If changes in the indicated locations or arrangements are made by the Contractor, they shall be made without additional charges.

B. Openings: Furnish information to the other trades on size and location of openings which are required in walls, slabs, roof, for piping and equipment at the proper times.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

D. Closing-In of Uninspected Work: Do not allow or cause any of the work to be covered up or enclosed until it has been inspected, tested, and approved by the Architect. Any work enclosed or covered prior to such inspection and test shall be uncovered and, after it has been inspected, tested, and approved, make all repairs with such materials as may be necessary to restore all work, including that of other trades, to its original and proper condition.

3.2 INSTALLATION

A. Install sinks level and plumb according to roughing-in drawings.

B. Install supports, affixed to building substrate, for wall-hung sinks.

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C. Install accessible wall-mounted sinks at handicapped/elderly mounting height according to ICC/ANSI A117.1.

D. Set floor-mounted sinks in leveling bed of cement grout.

E. Install water-supply piping with stop on each supply to each sink faucet.

1. Exception: Use ball, gate, or globe valves if supply stops are not specified with sink. Comply with valve requirements specified in Section 220523 "General-Duty Valves for Plumbing Piping."
2. Install stops in locations where they can be easily reached for operation.

F. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons if required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

G. Seal joints between sinks and counters, floors, and walls using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

H. Install protective shielding pipe covers and enclosures on exposed supplies and waste piping of accessible sinks. Comply with requirements in Section 220719 "Plumbing Piping Insulation."

3.3 CONNECTIONS

A. Connect sinks with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Operate and adjust sinks and controls. Replace damaged and malfunctioning sinks, fittings, and controls.

B. Adjust water pressure at faucets to produce proper flow.

3.5 CLEANING AND PROTECTION

A. After completing installation of sinks, inspect and repair damaged finishes.

B. Clean sinks, faucets, and other fittings with manufacturers' recommended cleaning methods and materials.

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C. Provide protective covering for installed sinks and fittings.

D. Do not allow use of sinks for temporary facilities unless approved in writing by Owner.

3.6 Completion of Installation:

A. Cleaning and Flushing: Clean all equipment and materials thoroughly. Leave surface to be painted smooth and clean, ready for painting.

B. Flush each unit of water supply and distribution system thoroughly with clean water at the highest velocities attainable.

C. Clean all piping, valves, traps, water heaters, fixtures and other devices thoroughly and flush or blow out until free of scale, oil silt, sand, sediment, pipe dope and foreign matter of any kind.

3.7 PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Division 6.

B. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.

C. Fixture controls shall comply with CBC Sections 11B-606.4 for lavatories and sinks.

D. Accessible sinks shall be 6-1/2" deep maximum. Sinks shall be mounted with front of the higher of the rim and counter surface 34" maximum above the finish floor or ground.

E. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks. CBC Section 11B-606.

END OF SECTION 22 42 16.16

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SECTION 22 47 16 - BOTTLE FILLING STATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes bottle filling station and related components.

1.3 WORK INCLUDED

A. Furnish all labor, materials, services, testing, transportation and equipment necessary for the completion of all plumbing work as indicated on drawings and specified herein. Work materials and equipment not indicated or specified which is necessary for the complete and proper operation of the work of this Section in accordance with the true intent and meaning of the contract documents shall be provided and incorporated at no additional cost to the Owner.

1.4 QUALITY ASSURANCE

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A. Code Requirements: All work covered by this Section shall conform to the latest requirements of the following regulations:

1. C.C.R., Title 24, Part 5 (2022 CPC).
2. 2022 California Plumbing Code.
3. SMACNA Seismic Restraint Manual Guidelines for Mechanical Systems.
4. National Fire Protection Association.
5. California Division of the State Architect.
6. California State Division of Industrial Safety.
7. County Health Department.
8. Any other legally constituted body-having jurisdiction thereof.
9. Access plumbing fixtures shall comply with all of the requirements of CBC Division 6.
10. Heights and location of all fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.
11. Accessible fixture controls shall comply with CBC Sections 11B-602.3 for drinking fountains.
12. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

B. Nothing in the specifications or drawings shall be construed to permit deviation from the requirements of governing codes unless approval for said deviation has been obtained from the legally constituted authorities having jurisdiction and from the Owner's representative.

1.5 DRAWINGS

A. Because of the small-scale drawings, it is not possible to indicate all offsets, fittings and accessories which may be required. The Contractor shall carefully investigate the conditions surrounding installation of his work, furnishing the necessary piping, fittings, valves, traps, and other devices which may be required to complete the installation.

B. The general arrangement indicated on the drawings shall be followed as closely as possible. Coordinate with the Architectural, Structural, Mechanical and Electrical Drawings and the work of other trades prior to installation of piping fixtures and equipment to verify adequate space available for installation of the work shown. In the event a field condition arises which makes it impossible to install the work as indicated, submit, in writing, the proposed departures to the Architect for his approval. Only when Architect's approval is given, in writing, shall Contractor proceed with installation of the work.

C. Special Note: Should the Contractor make changes in the installation differing from what is indicated on the contract drawings and not necessitated due to field conditions as indicated hereinabove, the Contractor shall be required to re-install the work to comply with what has been indicated on the contract drawings. Should it be impossible to re-install the work and the installation is in accordance with all governing authorities, the architect may permit the installation to remain. However, all costs incurred to revise the contract drawings by the engineer for resubmittal to the building department indicating the as-installed condition shall become the responsibility of the Contractor.

D. In case of a difference in the specifications or between the specifications and the drawings, the Contractor shall figure the most expensive alternate and after award of contract, shall secure direction from the Architect.

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1.6 PERMITS, INSPECTIONS AND LICENSES

A. All permits, inspections and licenses required by the legally constituted authorities for installation of the work according to the plans and specifications shall be obtained and paid as a part of the work of this section.

1.7 EXAMINATION OF PREMISES

A. Before bidding on this work, Contractors shall make a careful examination of the premises and shall thoroughly familiarize themselves with the requirements of the contract. By the act of submitting a proposal for the work included in this contract, the Contractor shall be deemed to have made such study and examination, and that he is familiar with and accepts all conditions of the site.

1.8 PROTECTION

A. All work, equipment and materials shall be protected at all times. Contractor shall make good all damage caused either directly or indirectly by his own workmen. Contractor shall also protect his own work from damage. He shall close all pipe openings with caps or plugs during installation. He shall protect all his equipment and materials against dirt, water, chemical and

mechanical injury. Upon completion, all work shall be thoroughly cleaned and delivered in a new condition.

B. Contractor shall be held responsible for all damage to equipment and materials until he has received written notice from the Architect or Engineer that his work has been accepted.

1.9 LOCATIONS

A. The locations of apparatus, piping and equipment indicated on the drawings are approximate. Piping and equipment shall be installed in such a manner as to avoid all obstruction, preserve headroom, and keep openings and passages clear. The locations of and mounting heights of all fixtures shall be coordinated with the architectural plans and room elevations.

B. Clearances and Openings: Contractor shall cooperate and coordinate his work with all other trades to avoid conflict and permit for a neat and orderly appearance of the entire installation. The Contractor shall, in advance of the work, furnish instructions to the General Contractor as to his requirements for equipment and material installation of any kind, whether or not specifically mentioned on drawings or in the specifications, and shall include recesses, chases in walls, and all required openings in the structure. Should furnishing this information be neglected, delayed or incorrect and additional cuttings are found to be required, the cost of the same shall be charged to this Contractor.

C. Contractor shall verify and coordinate pipe routing with location of all electrical rooms, elevator equipment rooms, telecom/data rooms, and other rooms dedicated to the housing of switchgear, panels, or other electrical equipment. In no case shall piping be installed within or above the ceiling of such rooms.

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1.10 SUBMITTAL DATA

A. Submittal Requirements:

1. Furnish, all at one time, prior to any installation, within the time noted below, six (6) copies of valid submittal data on all fixtures, material, equipment and devices. Each submitted item shall be indexed and referenced to these specifications and to identification numbers on fixtures and equipment schedules.
2. Manufacturers' submittal literature and shop drawings are required on all items to ensure the latest and most complete manufacturer's data is available for review. Requirements of the submittals and Engineer's submittal notes are a part of the work of this Division except that Engineer's notes may not be used as a means of increasing the scope of work of this Division.
3. Submittals will be checked for general conformance with the design concept of the project but the review does not guarantee quantities shown and does not supersede requirements of this Division to properly install work.
4. To be valid, all submittals must:

    a. Be delivered to the Architect's office within thirty-five (35) days of award of the contract. Contractor shall make time allowance for Engineer's review, return of comments, if any, and resubmittal if required. Corrections or changes in submittals returned as inadequate or incomplete shall be accomplished within this time limit.

b. Clearly indicate and label as such any items proposed as substitution for that specified or shown on plans.
c. Include all pertinent construction, installation, performance and technical data.
d. Have all product data sheets clearly labeled to indicate the individual items being submitted. In addition, all required options and accessories shall be clearly marked.

1) Product data sheets corresponding to items indicated on plans shall be clearly labeled with the corresponding fixture or equipment tag number.
2) Product data sheets corresponding to items indicated in specifications shall be clearly labeled with the specification section, page and item numbers.

e. Include, for every item which differs in size, configuration, connections, service, accessibility or any other significant way, a drawing to the same (or larger) scale as to the pertinent portions of the contract drawings. In this drawing show a complete layout of the system except that which is identical to the contract drawings, unless the unchanged portions must be shown to indicate such things as clearances. This drawing, together with the contract design drawings must show the complete system as revised to accommodate the proposed alternate.

B. Substitution Requirements:

1. Any items included in submittals and proposed by the Contractor as substitution for that specified or shown on plans shall be submitted within thirty five (35) days of award of the contract. After such time, proposed substitutions shall not be accepted for review, and the Contractor shall submit all items as specified or shown on plans.

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a. For each item proposed as substitution for that specified or shown on plans, copies of product data sheets for the specified item shall be placed side by side with product data sheets for the proposed substitution item within the submittal.

1) In addition to the Submittal Requirements for labeling listed above, product data sheets for the specified item shall be clearly labeled “SPECIFIED ITEM, NOT SUBMITTED”. Product data sheets for the corresponding proposed substitution item shall be clearly labeled “PROPOSED SUBSTITUTION”.

b. Provide calculations and other detailed data justifying how any items proposed as substitution were selected for proposal. Data must be complete enough to permit detailed comparison of every significant characteristic for which the specified item was analyzed during design.

2. It shall be the Contractor’s responsibility to provide sufficient information to allow the Engineer to analyze any proposed alternate. If inadequate information is provided, the proposal will not be approved and resubmittal will not be allowed.
3. The Contractor shall provide or perform tests required by Engineer for purpose of judging acceptability of proposed substitutions.
4. The Contractor assumes full responsibility that alternate items and procedures will meet the job requirements and is responsible for cost of redesign and of modifications to this and other parts of work caused by alternate items furnished under work in this Section. In view of these responsibilities, it is the purpose of these specifications to establish procedures to ensure that the Contractor has considered all the ramifications of proposed

alternates before submitting them for review. Submittals which do not comply with the requirements of these specifications or which indicate proposed alternates that were selected without proper regard to the requirements of the job will not be approved. No more than one proposed alternate will be considered for each item.

5. Alternate items installed without Engineer's approval will be replaced with specified items at Contractor's expense.
6. The Architect or his authorized representative shall be the sole judge as to the quality and suitability of proposed alternate equipment, fixtures or materials. Decisions of the Architect or that of his representative shall be final and conclusive.

1.11 UNINSPECTED WORK

A. The Contractor shall not allow or cause any of his work to be covered up or closed in until it has been inspected, tested, approved by all authorities have jurisdiction, and until Project Record drawings have been properly annotated.

B. Should any of his work be covered up or closed in before such inspection, he shall, at his own expense, uncover the work to the satisfaction of the inspection party. All related repair work cost shall be borne by the Contractor.

1.1 CLOSEOUT SUBMITTALS

A. Maintenance Data: For drinking fountains to include in maintenance manuals.

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1.2 RECORD DRAWINGS (Also see General Conditions)

A. Contractor shall provide and keep up-to-date a complete "as-built" record set of blueline prints which shall show every change from the original drawings and the exact "as-built" locations and sizes of the work provided under this Section of the specifications. This set shall include locations, dimensions, depth of buried piping, cleanouts, shut-off valves, sewer invert locations, plugged wyes, tees, etc. On completion of the work, the Contractor shall incorporate all as-built information on a set of reproducible tracings provided by the Architect and this set of reproducibles shall be delivered to the Architect.

1.3 GUARANTEES

A. Contractor shall guarantee the entire plumbing and piping systems unconditionally for a period of one (1) year after final acceptance. If, during this period, any materials, equipment, or any part of the systems fail to function properly, the Contractor shall make good the defects promptly and without any expense to the Owner.

B. Contractor shall be responsible for all damage to any part of the premises caused by leaks in pipelines or equipment furnished and installed under this Section for a period of one (1) year after date of acceptance of his work.

C. All equipment and fixtures shall carry manufacturer's warranty against defective parts or poor workmanship for not less than one (1) year. See specific equipment specifications for extended warranty requirements.

PART 2 - PRODUCTS

2.1 ELECTRIC WATER COOLERS

A. Electric Water Coolers: Stainless steel, wall mounted.

1. Stainless-Steel Bottle Filling Station:

   a. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:

      1) Elkay Manufacturing Co.
      2) Haws Corporation.

2. Standards:
   a. Comply with NSF 61.
   b. Comply with UL 1951.
   c. Comply with ASHRAE 34, "Designation and Safety Classification of Refrigerants," for water coolers. Provide HFC 134a (tetrafluoroethane) refrigerant unless otherwise indicated.

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3. Type Receptor: On horizontal support.
4. Back Panel: Stainless-steel wall plate behind electric water cooler.
5. Bubblers: Two, with adjustable stream regulator, located on deck.
6. Control: Push button.
7. Drain: Grid type with NPS 1-1/4 tailpiece.
8. Supply: NPS 3/8 with shutoff valve.
9. Waste Fitting: ASME A112.18.2/CSA B125.2, NPS 1-1/4 chrome-plated brass P-trap and waste.
10. Support: ASME A112.6.1M, Type III lavatory carrier.
11. Capacities and Characteristics:
12. Cooled Water: 8 gph.
13. Ambient-Air Temperature: 90 deg F.
14. Inlet-Water Temperature: 80 deg F.
15. Cooled-Water Temperature: 50 deg F.
16. Electrical Characteristics:
17. Motor Horsepower: 1/5.
18. Volts: 115-V ac.
19. Phase: Single.
20. Hertz: 60.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in for water-supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before fixture installation.

B. Examine walls and floors for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install fixtures level and plumb according to roughing-in drawings. For fixtures indicated for children, install at height required by authorities having jurisdiction.

B. Install off-the-floor carrier supports, affixed to building substrate, for wall-mounted fixtures.

C. Install water-supply piping with shutoff valve on supply to each fixture to be connected to domestic-water distribution piping. Use ball, gate, or globe valve. Install valves in locations where they can be easily reached for operation. Valves are specified in Section 220523 "General-Duty Valves for Plumbing Piping."

D. Install trap and waste piping on drain outlet of each fixture to be connected to sanitary drainage system.

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E. Install wall flanges or escutcheons at piping wall penetrations in exposed, finished locations. Use deep-pattern escutcheons where required to conceal protruding fittings. Comply with escutcheon requirements specified in Section 220518 "Escutcheons for Plumbing Piping."

F. Seal joints between fixtures and walls using sanitary-type, one-part, mildew-resistant, silicone sealant. Match sealant color to fixture color. Comply with sealant requirements specified in Section 079200 "Joint Sealants."

3.3 CONNECTIONS

A. Connect fixtures with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

B. Comply with water piping requirements specified in Section 221116 "Domestic Water Piping."

C. Install ball, gate, or globe shutoff valve on water supply to each fixture. Comply with valve requirements specified in Section 220523 "General-Duty Valves for Plumbing Piping."

D. Comply with soil and waste piping requirements specified in Section 221316 "Sanitary Waste and Vent Piping."

3.4 ADJUSTING

A. Adjust fixture flow regulators for proper flow and stream height.

3.5 CLEANING

A. After installing fixtures, inspect unit. Remove paint splatters and other spots, dirt, and debris. Repair damaged finish to match original finish.

B. Clean fixtures, on completion of installation, according to manufacturer's written instructions.

C. Provide protective covering for installed fixtures.

D. Do not allow use of fixtures for temporary facilities unless approved in writing by Owner.

3.6 PLUMBING FIXTURES

A. Accessible plumbing fixtures shall comply with all of the requirements of CBC Division 6.

B. Heights and location of all accessible fixtures shall be mounted according to CBC Sections 11B-602 through 11B-612.

C. Fixture controls shall comply with CBC Sections 11B-601.3 for drinking fountains.

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D. Accessible sinks shall be 6-1/2" deep maximum. Sinks shall be mounted with front of the higher of the rim and counter surface 34" maximum above the finish floor or ground.

E. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks. CBC Section 11B-606.

END OF SECTION 22 47 16

SECTION 23 05 00 - COMMON WORK RESULTS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Piping materials and installation instructions common to most piping systems.
   2. Mechanical sleeve seals.
   3. Sleeves.
   4. Grout.
   5. HVAC demolition.
   6. Equipment installation requirements common to equipment sections.
   7. Painting and finishing.
   8. Concrete bases.
   9. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

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C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. CPVC: Chlorinated polyvinyl chloride plastic.
   2. PE: Polyethylene plastic.
   3. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. EPDM: Ethylene-propylene-diene terpolymer rubber.
   2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:
   1. Mechanical sleeve seals.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
   1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
   2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for HVAC Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for HVAC installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for HVAC items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Division 23 piping Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Division 23 piping Sections for special joining materials not listed below.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
   1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
      a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
      b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
   2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated; and AWS A5.8, BAg1, silver alloy for refrigerant piping, unless otherwise indicated.
G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 MECHANICAL SLEEVE SEALS
A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
1. Manufacturers:
a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.
2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

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2.5 SLEEVES
A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.
B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with set screws.

2.6 GROUT
A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi, 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 HVAC DEMOLITION
A. Refer to Division 01 Section "Cutting and Patching" and Division 02 Section "Selective Structure Demolition" for general demolition requirements and procedures.
B. Disconnect, demolish, and remove HVAC systems, equipment, and components indicated to be removed.

1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
3. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
4. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
5. Equipment to Be Removed: Disconnect and cap services and remove equipment.
6. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
7. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 23 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

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C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Sleeves are not required for core-drilled holes.

M. Permanent sleeves are not required for holes formed by removable PE sleeves.

N. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

O. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.
   a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
2. Install sleeves in new walls and slabs as new walls and slabs are constructed.

3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
   a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
   b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
   c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
      1) Seal space outside of sleeve fittings with grout.
4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.

P. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

Q. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

R. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 07 Section "Penetration Firestopping" for materials.

S. Verify final equipment locations for roughing-in.

T. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

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3.3 PIPING JOINT CONSTRUCTION

A. Join pipe and fittings according to the following requirements and Division 23 Sections specifying piping systems.

B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.

E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.

F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
   1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
   2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.

H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

3.4 PIPING CONNECTIONS

A. Make connections according to the following, unless otherwise indicated:
   1. Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment.
   2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
   3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
   4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.5 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

A. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.

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B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

D. Install equipment to allow right of way for piping installed at required slope.

3.6 PAINTING

A. Painting of HVAC systems, equipment, and components is specified in Division 09 Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.
   1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
   2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
   3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
   4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03 Section "Cast-in-Place Concrete."

3.8 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Division 05 Section "Metal Fabrications" for structural steel.
B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor HVAC materials and equipment.
C. Field Welding: Comply with AWS D1.1.

3.9 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor HVAC materials and equipment.
B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
C. Attach to substrates as required to support applied loads.

3.10 GROUTING

A. Mix and install grout for HVAC equipment base bearing surfaces, pump and other equipment base plates, and anchors.
B. Clean surfaces that will come into contact with grout.
C. Provide forms as required for placement of grout.
D. Avoid air entrapment during placement of grout.
E. Place grout, completely filling equipment bases.
F. Place grout on concrete bases and provide smooth bearing surface for equipment.
G. Place grout around anchors.
H. Cure placed grout.

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END OF SECTION 230500

SECTION 23 05 29 HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Metal pipe hangers and supports.
   2. Trapeze pipe hangers.
B. Related Sections:
   1. Section 233113 "Metal Ducts" for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
   1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
   2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
   3. Design seismic-restraint hangers and supports for piping and equipment.

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1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
   1. Trapeze pipe hangers.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.

1.7 QUALITY ASSURANCE

A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

PART 2 - PRODUCTS

2.1 METAL PIPE HANGERS AND SUPPORTS

A. Carbon-Steel Pipe Hangers and Supports:
   1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
   2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.

3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.

2.2 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

2.3 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
   1. Properties: Nonstaining, noncorrosive, and nongaseous.
   2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT INSTALLATION

A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
   1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
   2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
D. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
E. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
F. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
G. Install lateral bracing with pipe hangers and supports to prevent swaying.
H. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
I. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
J. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
K. Insulated Piping:

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1. Attach clamps and spacers to piping.
   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
   a. Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
   a. Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
4. Shield Dimensions for Pipe: Not less than the following:
   a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
   b. NPS 4: 12 inches long and 0.06 inch thick.
   c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
   d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
   e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

3.2 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

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B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

3.3 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

3.4 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
   1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.5 HANGER AND SUPPORT SCHEDULE

A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
E. Use carbon-steel pipe hangers and supports and metal framing systems and attachments for general service applications.
F. Use copper-plated pipe hangers and copper attachments for copper piping and tubing.
G. Use padded hangers for piping that is subject to scratching.
H. Use thermal-hanger shield inserts for insulated piping and tubing.
I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
    1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
J. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
    1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
    2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
    3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
    4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
    5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
K. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
    1. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
L. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
    1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
    2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
    3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
M. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
N. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.

END OF SECTION 23 05 29

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SECTION 23 05 48 - VIBRATION AND SEISMIC CONTROLS FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Elastomeric isolation pads.
2. Restrained-spring isolators.
3. Elastomeric hangers.
4. Spring hangers.
5. Snubbers.
6. Restraint channel bracings.
7. Restraint cables.
8. Seismic-restraint accessories.
9. Mechanical anchor bolts.
10. Adhesive anchor bolts.
11. Vibration isolation equipment bases.

1.3 DEFINITIONS

A. IBC: International Building Code.
B. ICC-ES: ICC-Evaluation Service.
C. OSHPD: Office of Statewide Health Planning & Development (for the State of California).

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1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES, OSHPD, or an agency acceptable to authorities having jurisdiction.
b. Annotate to indicate application of each product submitted and compliance with requirements.
3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

B. Shop Drawings:
1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.

B. Qualification Data: For professional engineer and testing agency.
C. Welding certificates.
D. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

PART 2 - PRODUCTS

2.1 ELASTOMERIC ISOLATION PADS

A. Elastomeric Isolation Pads:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
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a. Ace Mountings Co., Inc.
b. California Dynamics Corporation.
c. Isolation Technology, Inc.
d. Kinetics Noise Control, Inc.
e. Mason Industries, Inc.
f. Vibration Eliminator Co., Inc.
g. Vibration Isolation.
h. Vibration Mountings & Controls, Inc.
2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
3. Size: Factory or field cut to match requirements of supported equipment.
4. Pad Material: Oil and water resistant with elastomeric properties.
5. Surface Pattern: Smooth pattern.
6. Infused nonwoven cotton or synthetic fibers.

2.2 RESTRAINED-SPRING ISOLATORS

A. Freestanding, Laterally Stable, Open-Spring Isolators with Vertical-Limit Stop Restraint:
1. Manufacturers: Subject to compliance with requirements, products by one of the following:
a. Ace Mountings Co., Inc.
b. California Dynamics Corporation.
c. Isolation Technology, Inc.
d. Kinetics Noise Control, Inc.
e. Mason Industries, Inc.
f. Vibration Eliminator Co., Inc.

g. Vibration Isolation.
h. Vibration Mountings & Controls, Inc.

2. Housing: Steel housing with vertical-limit stops to prevent spring extension due to weight being removed.
   a. Base with holes for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
   b. Top plate with threaded mounting holes.
   c. Internal leveling bolt that acts as blocking during installation.
3. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
4. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
5. Minimum Additional Travel: 50 percent of the required deflection at rated load.
6. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
7. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

2.3 ELASTOMERIC HANGERS

A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Ace Mountings Co., Inc.
      b. California Dynamics Corporation.
      c. Isolation Technology, Inc.
      d. Kinetics Noise Control, Inc.
      e. Mason Industries, Inc.
      f. Vibration Eliminator Co., Inc.
      g. Vibration Mountings & Controls, Inc.
   2. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
   3. Dampening Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel to steel contact.

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2.4 SPRING HANGERS

A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Ace Mountings Co., Inc.
      b. California Dynamics Corporation.
      c. Kinetics Noise Control, Inc.
      d. Mason Industries, Inc.
      e. Vibration Eliminator Co., Inc.
      f. Vibration Isolation.
      g. Vibration Mountings & Controls, Inc.
   2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
   3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.

4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

2.5 SNUBBERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Kinetics Noise Control, Inc.
   2. Mason Industries, Inc.
   3. Vibration Mountings & Controls, Inc.

B. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
   1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
   2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
   3. Maximum 1/4-inch air gap, and minimum 1/4-inch- thick resilient cushion.

2.6 RESTRAINT CHANNEL BRACINGS

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A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cooper B-Line, Inc.
   2. Hilti, Inc.
   3. Mason Industries, Inc.
   4. Unistrut.

B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

2.7 RESTRAINT CABLES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Kinetics Noise Control, Inc.
   2. Loos & Co., Inc.
   3. Vibration Mountings & Controls, Inc.

B. Restraint Cables: ASTM A 603 galvanized-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

2.8 SEISMIC-RESTRAINT ACCESSORIES

A. Manufacturers: Subject to compliance with requirements provide products by one of the following:
   1. Cooper B-Line, Inc.
   2. Kinetics Noise Control, Inc.

3. Mason Industries, Inc.
4. TOLCO.

B. Hanger-Rod Stiffener: Reinforcing steel angle clamped to hanger rod.

C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to restraint cables.

D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.

E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.

F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

2.9 MECHANICAL ANCHOR BOLTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper B-Line, Inc.
2. Hilti, Inc.
3. Kinetics Noise Control, Inc.
4. Mason Industries, Inc.

B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

2.10 VIBRATION ISOLATION EQUIPMENT BASES

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A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. California Dynamics Corporation.
2. Kinetics Noise Control.
3. Mason Industries, Inc.
4. Vibration Eliminator Co., Inc.
5. Vibration Isolation.
6. Vibration Mountings & Controls, Inc.

B. Steel Rails: Factory-fabricated, welded, structural-steel rails.
1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide rails.
a. Include supports for suction and discharge elbows for pumps.
2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Rails shall have shape to accommodate supported equipment.
3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

C. Steel Bases: Factory-fabricated, welded, structural-steel bases and rails.
1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
a. Include supports for suction and discharge elbows for pumps.
2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.

D. Concrete Inertia Base: Factory-fabricated, welded, structural-steel bases and rails ready for placement of cast-in-place concrete.
   1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
      a. Include supports for suction and discharge elbows for pumps.
   2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
   3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
   4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION
A. Examine areas and equipment to receive vibration isolation and seismic- and wind-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATIONS
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A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES, OSHPD, or an agency acceptable to authorities having jurisdiction.
B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

3.3 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION
A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."
B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
C. Comply with requirements in Section 077200 "Roof Accessories" for installation of roof curbs, equipment supports, and roof penetrations.
D. Equipment Restraints:
   1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
   2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
   3. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES, OSHPD, or an agency acceptable to authorities having jurisdiction that provides required submittals for component.

E. Piping Restraints:
   1. Comply with requirements in MSS SP-127.
   2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
   3. Brace a change of direction longer than 12 feet.
F. Install cables so they do not bend across edges of adjacent equipment or building structure.
G. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES, OSHPD, or an agency acceptable to authorities having jurisdiction that provides required submittals for component.
H. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
I. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.
J. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
K. Drilled-in Anchors:
   1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
   2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
   3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
   4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
   5. Set anchors to manufacturer's recommended torque, using a torque wrench.
   6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

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3.4 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION

A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Section 232113 "Hydronic Piping" for piping flexible connections.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
B. Perform tests and inspections.
C. Tests and Inspections:
   1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
   2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless postconnection testing has been approved), and with at least seven days' advance notice.

3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
5. Test to 90 percent of rated proof load of device.
6. Measure isolator restraint clearance.
7. Measure isolator deflection.
8. Verify snubber minimum clearances.
9. Test and adjust restrained-air-spring isolator controls and safeties.

D. Remove and replace malfunctioning units and retest as specified above.
E. Prepare test and inspection reports.

3.6 ADJUSTING

A. Adjust isolators after piping system is at operating weight.
B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

3.7 VIBRATION ISOLATION EQUIPMENT BASES INSTALLATION

A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete."

END OF SECTION 230548

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SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Equipment labels.
   2. Warning signs and labels.
   3. Pipe labels.
   4. Duct labels.
   5. Stencils.
   6. Warning tags.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
B. Coordinate installation of identifying devices with locations of access panels and doors.
C. Install identifying devices before installing acoustical ceilings and similar concealment.

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PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:
   1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
   2. Letter Color: White.
   3. Background Color: Black.
   4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
   5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
   6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   7. Fasteners: Stainless-steel self-tapping screws.
   8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
B. Label Content: Include equipment's unique equipment number.
C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number, manufacturer, model number, and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
B. Letter Color: Black.
C. Background Color: Yellow.
D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
G. Fasteners: Stainless-steel rivets or self-tapping screws.
H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
    1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
    2. Lettering Size: At least 1-1/2 incheshigh.

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2.4 DUCT LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
B. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
C. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
D. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
E. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
F. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, and an arrow indicating flow direction.
    1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
    2. Lettering Size: At least 1-1/2 inches high.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
    1. Size: 3 by 5-1/4 inches minimum.
    2. Fasteners: Brass grommet and wire.

3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.
B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in other sections.
B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
   4. At access doors, manholes, and similar access points that permit view of concealed piping.
   5. Near major equipment items and other points of origination and termination.
   6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
C. Pipe Label Color Schedule:
   1. Refrigerant Piping:
      a. Background Color: Orange.
      b. Letter Color: Black.

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3.4 DUCT LABEL INSTALLATION

A. Install plastic-laminated duct labels with permanent adhesive on air ducts in the following color codes:
   1. Blue: For cold-air supply ducts.
   2. Yellow: For hot-air supply ducts.
   3. Green: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
   4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.5 VALVE-TAG INSTALLATION

A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
   1. Valve-Tag Size and Shape:
      a. All Valve-Tags: 1-1/2 inches minimum, round.
   2. Valve-Tag Color:
      a. All Valve-Tags: Natural.
   3. Letter Color:
      a. All Valve-Tags: Black.

3.6 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 230553

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SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Balancing Air Systems:
      a. Constant-volume air systems.

1.3 DEFINITIONS

A. AABC: Associated Air Balance Council.
B. TAB: Testing, adjusting, and balancing.
C. TAB Specialist: An entity engaged to perform TAB Work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
D. Certified TAB reports.
E. Sample report forms.
F. Instrument calibration reports, to include the following:
   1. Instrument type and make.
   2. Serial number.
   3. Application.
   4. Dates of use.
   5. Dates of calibration.

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1.5 QUALITY ASSURANCE

A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC.
   1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC.
   2. TAB Technician: Employee of the TAB contractor and who is certified by AABC as a TAB technician.
B. TAB Conference: Meet with Owner on approval of the TAB strategies and procedures plan to develop a mutual understanding of the details. Require the participation of the TAB field supervisor and technicians. Provide seven days' advance notice of scheduled meeting time and location.
   1. Agenda Items:
      a. The Contract Documents examination report.
      b. The TAB plan.
      c. Coordination and cooperation of trades and subcontractors.
      d. Coordination of documentation and communication flow.
C. Certify TAB field data reports and perform the following:

1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.
2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.

D. TAB Report Forms: Use standard TAB contractor's forms approved by Architect.
E. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."
F. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
G. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

1.6 PROJECT CONDITIONS

A. Full Owner Occupancy: Owner will occupy the site and existing building during entire TAB period. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

1.7 COORDINATION

A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
B. Perform TAB after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

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3.1 EXAMINATION

A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers. Verify that locations of these balancing devices are accessible.
C. Examine the approved submittals for HVAC systems and equipment.
D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
E. Examine ceiling plenums and underfloor air plenums used for supply, return, or relief air to verify that they meet the leakage class of connected ducts as specified in Section 233113 "Metal Ducts" and are properly separated from adjacent areas. Verify that penetrations in plenum walls are sealed and fire-stopped if required.
F. Examine equipment performance data including fan and pump curves.
   1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
   2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.

G. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
H. Examine test reports specified in individual system and equipment Sections.
I. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
J. Examine operating safety interlocks and controls on HVAC equipment.
K. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

3.2 PREPARATION

A. Prepare a TAB plan that includes strategies and step-by-step procedures.
B. Complete system-readiness checks and prepare reports. Verify the following:
   1. Permanent electrical-power wiring is complete.
   2. Automatic temperature-control systems are operational.
   3. Equipment and duct access doors are securely closed.
   4. Balance, smoke, and fire dampers are open.
   5. Isolating and balancing valves are open and control valves are operational.
   6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
   7. Windows and doors can be closed so indicated conditions for system operations can be met.

3.3 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Total System Balance", ASHRAE 111, and SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
   1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
   1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
   2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
   3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
D. Take and report testing and balancing measurements in inch-pound (IP) units.

3.4 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
B. Prepare schematic diagrams of systems' "as-built" duct layouts.
C. For variable-air-volume systems, develop a plan to simulate diversity.
D. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.

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E. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
G. Verify that motor starters are equipped with properly sized thermal protection.
H. Check dampers for proper position to achieve desired airflow path.
I. Check for airflow blockages.
J. Check condensate drains for proper connections and functioning.
K. Check for proper sealing of air-handling-unit components.
L. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

3.5 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS

A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
   1. Measure total airflow.
      a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
   2. Measure fan static pressures as follows to determine actual static pressure:
      a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
      b. Measure static pressure directly at the fan outlet or through the flexible connection.
      c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
      d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
   3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
      a. Report the cleanliness status of filters and the time static pressures are measured.
   4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
   5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
   6. Obtain approval from Architect for adjustment of fan speed higher or lower than indicated speed. Comply with requirements in HVAC Sections for air-handling units for adjustment of fans, belts, and pulley sizes to achieve indicated air-handling-unit performance.
   7. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.

B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.
   1. Measure airflow of submain and branch ducts.
      a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.

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2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.

C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.

D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
2. Adjust patterns of adjustable outlets for proper distribution without drafts.

3.6 PROCEDURES FOR MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
2. Motor horsepower rating.
3. Motor rpm.
4. Efficiency rating.
5. Nameplate and measured voltage, each phase.
6. Nameplate and measured amperage, each phase.
7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

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3.7 TOLERANCES

A. Set HVAC system's air flow rates and water flow rates within the following tolerances:
1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
2. Air Outlets and Inlets: Plus or minus 10 percent.

3.8 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

3.9 FINAL REPORT

A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
2. Include a list of instruments used for procedures, along with proof of calibration.

B. Final Report Contents: In addition to certified field-report data, include the following:
1. Pump curves.

2. Fan curves.
3. Manufacturers' test data.
4. Field test reports prepared by system and equipment installers.
5. Other information relative to equipment performance; do not include Shop Drawings and product data.

C. General Report Data: In addition to form titles and entries, include the following data:
1. Title page.
2. Name and address of the TAB contractor.
3. Project name.
4. Project location.
5. Architect's name and address.
6. Engineer's name and address.
7. Contractor's name and address.
8. Report date.
9. Signature of TAB supervisor who certifies the report.
10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
11. Summary of contents including the following:
    a. Indicated versus final performance.
    b. Notable characteristics of systems.
    c. Description of system operation sequence if it varies from the Contract Documents.
12. Nomenclature sheets for each item of equipment.
13. Data for terminal units, including manufacturer's name, type, size, and fittings.
14. Notes to explain why certain final data in the body of reports vary from indicated values.
15. Test conditions for fans and pump performance forms including the following:
    a. Settings for outdoor-, return-, and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet- and dry-bulb conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume systems.
    g. Settings for supply-air, static-pressure controller.
    h. Other system operating conditions that affect performance.

D. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outdoor, supply, return, and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet, and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Position of balancing devices.

E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data:
    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.

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f. Unit arrangement and class.
g. Discharge arrangement.
h. Sheave make, size in inches, and bore.
i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
j. Number, make, and size of belts.
k. Number, type, and size of filters.

2. Motor Data:
a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.

3. Test Data (Indicated and Actual Values):
a. Total air flow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Filter static-pressure differential in inches wg.
f. Preheat-coil static-pressure differential in inches wg.
g. Cooling-coil static-pressure differential in inches wg.
h. Heating-coil static-pressure differential in inches wg.
i. Outdoor airflow in cfm.
j. Return airflow in cfm.
k. Outdoor-air damper position.
l. Return-air damper position.
m. Vortex damper position.

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F. Fan Test Reports: For supply, return, and exhaust fans, include the following:

1. Fan Data:
a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Center-to-center dimensions of sheave, and amount of adjustments in inches.

2. Motor Data:
a. Motor make, and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Center-to-center dimensions of sheave, and amount of adjustments in inches.
g. Number, make, and size of belts.

3. Test Data (Indicated and Actual Values):
a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.

e. Suction static pressure in inches wg.

G. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data:
a. System and air-handling-unit number.
b. Location and zone.
c. Traverse air temperature in deg F.
d. Duct static pressure in inches wg.
e. Duct size in inches.
f. Duct area in sq. ft..
g. Indicated air flow rate in cfm.
h. Indicated velocity in fpm.
i. Actual air flow rate in cfm.
j. Actual average velocity in fpm.
k. Barometric pressure in psig.

H. Instrument Calibration Reports:
1. Report Data:
a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

3.10 INSPECTIONS

A. Initial Inspection:
1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
2. Check the following for each system:
a. Measure airflow of at least 10 percent of air outlets.
b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
c. Verify that balancing devices are marked with final balance position.
d. Note deviations from the Contract Documents in the final report.

B. Final Inspection:
1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect.
2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Owner.
3. Owner shall randomly select measurements, documented in the final report, to be rechecked. Rechecking shall be limited to either 10 percent of the total measurements recorded or the extent of measurements that can be accomplished in a normal 8-hour business day.
4. If rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
5. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

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C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
   1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
   2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.

D. Prepare test and inspection reports.

3.11 ADDITIONAL TESTS

A. Within 90 days of completing TAB, perform additional TAB to verify that balanced conditions are being maintained throughout and to correct unusual conditions.

B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

END OF SECTION 230593

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SECTION 23 07 13 - DUCT INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following duct services:
   1. Indoor, concealed supply and outdoor air.
   2. Indoor, exposed supply and outdoor air.
   3. Indoor, concealed return located in unconditioned space.
   4. Indoor, exposed return located in unconditioned space.
   5. Indoor, exposed exhaust between isolation damper and penetration of building exterior.
   6. Outdoor, concealed supply and return.
   7. Outdoor, exposed supply and return.

B. Related Sections:
   1. Section 230716 "HVAC Equipment Insulation."
   2. Section 230719 "HVAC Piping Insulation."
   3. Section 233113 "Metal Ducts" for duct liners.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
   2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
   3. Detail application of field-applied jackets.
   4. Detail application at linkages of control devices.

C. Samples: For each type of insulation and jacket indicated. Identify each Sample, describing product and intended use. Sample sizes are as follows:
   1. Sheet Form Insulation Materials: 12 inches square.
   2. Sheet Jacket Materials: 12 inches square.
   3. Manufacturer's Color Charts: For products where color is specified, show the full range of colors available for each type of finish material.

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1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
   2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

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PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
F. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. CertainTeed Corp.; SoftTouch Duct Wrap.
      b. Johns Manville; Microlite.
      c. Knauf Insulation; Friendly Feel Duct Wrap.
      d. Owens Corning; SOFTR All-Service Duct Wrap.

2.2 FIRE-RATED INSULATION SYSTEMS

A. Fire-Rated Board: Structural-grade, press-molded, xonolite calcium silicate, fireproofing board suitable for operating temperatures up to 1700 deg F. Comply with ASTM C 656, Type II, Grade 6. Tested and certified to provide a [1] [2]-hour fire rating by an NRTL acceptable to authorities having jurisdiction.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Johns Manville; Super Firetemp M.

B. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a [1] [2]-hour fire rating by an NRTL acceptable to authorities having jurisdiction.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. CertainTeed Corp.; FlameChek.
      b. Johns Manville; Firetemp Wrap.
      c. Nelson Fire Stop Products; Nelson FSB Flameshield Blanket.
      d. Thermal Ceramics; FireMaster Duct Wrap.
      e. 3M; Fire Barrier Wrap Products.
      f. Unifrax Corporation; FyreWrap.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.
      b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.
   2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
      b. Eagle Bridges - Marathon Industries; 225.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.Mon-Eco Industries, Inc.; 22-25.
   2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
   1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

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B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
      b. Vimasco Corporation; 749.
   2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
   3. Service Temperature Range: Minus 20 to plus 180 deg F.
   4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
   5. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
      b. Eagle Bridges - Marathon Industries; 550.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
      d. Mon-Eco Industries, Inc.; 55-50.
      e. Vimasco Corporation; WC-1/WC-5.
   2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
   3. Service Temperature Range: Minus 20 to plus 180 deg F.
   4. Solids Content: 60 percent by volume and 66 percent by weight.
   5. Color: White.

2.5 LAGGING ADHESIVES

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A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
   1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   2. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
      b. Vimasco Corporation; 713 and 714.
   3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
   4. Service Temperature Range: 0 to plus 180 deg F.
   5. Color: White.

2.6 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.Eagle Bridges - Marathon Industries; 405.
      b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
      c. Mon-Eco Industries, Inc.; 44-05.
   2. Materials shall be compatible with insulation materials, jackets, and substrates.
   3. Fire- and water-resistant, flexible, elastomeric sealant.
   4. Service Temperature Range: Minus 40 to plus 250 deg F.
   5. Color: Aluminum.

6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.

2.9 TAPES

A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
a. ABI, Ideal Tape Division; 491 AWF FSK.
b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
c. Compac Corporation; 110 and 111.
d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

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2.10 SECUREMENTS

A. Bands:
1. Products: Subject to compliance with requirements, provide one of the following:
a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304; 0.015-inch-thick, 1/2 inch wide with wing seal or closed seal.
3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:
1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
a. Products: Subject to compliance with requirements, provide one of the following:
1) AGM Industries, Inc.; CHP-1.
2) GEMCO; Cupped Head Weld Pin.
3) Midwest Fasteners, Inc.; Cupped Head.
4) Nelson Stud Welding; CHP.

2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Products: Subject to compliance with requirements, provide one of the following:
      1) AGM Industries, Inc.; RC-150.
      2) GEMCO; R-150.
      3) Midwest Fasteners, Inc.; WA-150.
      4) Nelson Stud Welding; Speed Clips.
   b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
3. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
   a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      1) GEMCO.
      2) Midwest Fasteners, Inc.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
D. Wire: 0.062-inch soft-annealed, galvanized steel.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. C & F Wire.

2.11 CORNER ANGLES

A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
   1. Verify that systems to be insulated have been tested and are free of defects.
   2. Verify that surfaces to be insulated are clean and dry.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
E. Install multiple layers of insulation with longitudinal and end seams staggered.
F. Keep insulation materials dry during application and finishing.

G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
H. Install insulation with least number of joints practical.
I. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
   1. Install insulation continuously through hangers and around anchor attachments.
   2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
   3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
K. Install insulation with factory-applied jackets as follows:
   1. Draw jacket tight and smooth.
   2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
   3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
      a. For below ambient services, apply vapor-barrier mastic over staples.
   4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
   5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
   4. Seal jacket to roof flashing with flashing sealant.
B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation,

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install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.

3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
4. Seal jacket to wall flashing with flashing sealant.

C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

1. Comply with requirements in Section 078413 "Penetration Firestopping"irestopping and fire-resistive joint sealers.

E. Insulation Installation at Floor Penetrations:

1. Duct: For penetrations through fire-rated assemblies, terminate insulation at fire damper sleeves and externally insulate damper sleeve beyond floor to match adjacent duct insulation. Overlap damper sleeve and duct insulation at least 2 inches.
2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 INSTALLATION OF MINERAL-FIBER INSULATION

A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.

1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.

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3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
   a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
   b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
   c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
   d. Do not overcompress insulation during installation.
   e. Impale insulation over pins and attach speed washers.
   f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
   a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
   b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped

pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.

5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

3.6 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:
   1. Draw jacket material smooth and tight.
   2. Install lap or joint strips with same material as jacket.
   3. Secure jacket to insulation with manufacturer's recommended adhesive.
   4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
   5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.
B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

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3.7 FIRE-RATED INSULATION SYSTEM INSTALLATION

A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
B. Insulate duct access panels and doors to achieve same fire rating as duct.
C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Section 078413 "Penetration Firestopping."

3.8 FINISHES

A. Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
   1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
      a. Finish Coat Material: Interior, flat, latex-emulsion size.
B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
B. Perform tests and inspections.
C. Tests and Inspections:

1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location for each duct system defined in the "Duct Insulation Schedule, General" Article.

D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 DUCT INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:
1. Indoor, concealed supply and outdoor air.
2. Indoor, exposed supply and outdoor air.
3. Indoor, concealed return located in unconditioned space.
4. Indoor, exposed return located in unconditioned space.
5. Outdoor, concealed supply and return.
6. Outdoor, exposed supply and return.

B. Items Not Insulated:
1. Fibrous-glass ducts.
2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
3. Factory-insulated flexible ducts.
4. Factory-insulated plenums and casings.
5. Flexible connectors.
6. Vibration-control devices.
7. Factory-insulated access panels and doors.

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3.11 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Concealed, supply-air duct and plenum insulation shall be one of the following:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. Ft. nominal density.

B. Concealed, return-air duct and plenum insulation shall be one of the following:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. Ft. nominal density.

C. Concealed, outdoor-air duct and plenum insulation shall be one of the following:
1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. Ft. nominal density.

D. Exposed, supply-air duct and plenum insulation shall be the following:
1. Internally lined per Section 233113 “Metal Ducts.”

E. Exposed, return-air duct and plenum insulation shall be the following:
1. Internally lined per Section 233113 “Metal Ducts.”

F. Exposed, outdoor-air duct and plenum insulation shall be the following:
1. Internally lined per Section 233113 “Metal Ducts.”

3.12 ABOVEGROUND, OUTDOOR DUCT AND PLENUM INSULATION SCHEDULE

A. Insulation materials and thicknesses are identified below. If more than one material is listed for a duct system, selection from materials listed is Contractor's option.

B. Outdoor, supply-air duct and plenum insulation shall be the following:
1. Internally lined per Section 233113 “Metal Ducts.”

C. Outdoor, return-air duct and plenum insulation shall be the following:
1. Internally lined per Section 233113 “Metal Ducts.”

D. Outdoor, outdoor-air duct and plenum insulation shall be the following:
1. Internally lined per Section 233113 “Metal Ducts.”

END OF SECTION 230713

SECTION 23 07 19 - HVAC PIPING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes insulating the following HVAC piping systems:
   1. Condensate drain piping, indoors and outdoors.
   2. Refrigerant suction and hot-gas piping, indoors and outdoors.

B. Related Sections:
   1. Section 230713 "Duct Insulation."
   2. Section 230716 "HVAC Equipment Insulation."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory and field applied if any).

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
   2. Detail attachment and covering of heat tracing inside insulation.
   3. Detail insulation application at pipe expansion joints for each type of insulation.
   4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
   5. Detail removable insulation at piping specialties.
   6. Detail application of field-applied jackets.
   7. Detail application at linkages of control devices.

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1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.

C. Field quality-control reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
   2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

1.7 COORDINATION

A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."

B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

C. Coordinate installation and testing of heat tracing.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

PART 2 - PRODUCTS

2.1 INSULATION MATERIALS

A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.

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B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Aeroflex USA, Inc.; Aerocel.
   b. Armacell LLC; AP Armaflex.
   c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

2.2 INSULATING CEMENTS

A. Mineral-Fiber Insulating Cement: Comply with ASTM C 195.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Ramco Insulation, Inc.; Super-Stik.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.

B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:
   a. Aeroflex USA, Inc.; Aeroseal.
   b. Armacell LLC; Armaflex 520 Adhesive.

c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.
d. K-Flex USA; R-373 Contact Adhesive.

2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. ASJ Adhesive, and FSK and PVDC Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
b. Eagle Bridges - Marathon Industries; 225.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50.
d. Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
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1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
b. Vimasco Corporation; 749.
2. Water-Vapor Permeance: ASTM E 96/E 96M, Procedure B, 0.013 perm at 43-mil dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
5. Color: White.

C. Breather Mastic: Water based; suitable for indoor and outdoor use on above-ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
b. Eagle Bridges - Marathon Industries; 550.
c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
d. Mon-Eco Industries, Inc.; 55-50.
e. Vimasco Corporation; WC-1/WC-5.
2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
3. Service Temperature Range: Minus 20 to plus 180 deg F.
4. Solids Content: 60 percent by volume and 66 percent by weight.
5. Color: White.

2.5 LAGGING ADHESIVES

A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
   1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   2. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.
      b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
      c. Vimasco Corporation; 713 and 714.
   3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over pipe insulation.
   4. Service Temperature Range: 0 to plus 180 deg F.
   5. Color: White.

2.6 SEALANTS

A. FSK and Metal Jacket Flashing Sealants:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
      b. Eagle Bridges - Marathon Industries; 405.
      c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
      d. Mon-Eco Industries, Inc.; 44-05.
   2. Materials shall be compatible with insulation materials, jackets, and substrates.
   3. Fire- and water-resistant, flexible, elastomeric sealant.
   4. Service Temperature Range: Minus 40 to plus 250 deg F.
   5. Color: Aluminum.
   6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
   2. Materials shall be compatible with insulation materials, jackets, and substrates.
   3. Fire- and water-resistant, flexible, elastomeric sealant.
   4. Service Temperature Range: Minus 40 to plus 250 deg F.
   5. Color: White.
   6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

2.7 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

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1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
C. Metal Jacket:
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Metal Jacketing Systems.
      b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
      c. RPR Products, Inc.; Insul-Mate.
   2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
      a. Factory cut and rolled to size.
      b. Finish and thickness are indicated in field-applied jacket schedules.
      c. Moisture Barrier for Outdoor Applications: 3-mil- thick, heat-bonded polyethylene and kraft paper.
      d. Factory-Fabricated Fitting Covers:
         1) Same material, finish, and thickness as jacket.
         2) Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
         3) Tee covers.
         4) Flange and union covers.
         5) End caps.
         6) Beveled collars.
         7) Valve covers.
         8) Field fabricate fitting covers only if factory-fabricated fitting covers are not available.

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2.9 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. ABI, Ideal Tape Division; 428 AWF ASJ.
      b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
      c. Compac Corporation; 104 and 105.
      d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
   2. Width: 3 inches.
   3. Thickness: 11.5 mils.
   4. Adhesion: 90 ounces force/inch in width.
   5. Elongation: 2 percent.
   6. Tensile Strength: 40 lbf/inch in width.
   7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. ABI, Ideal Tape Division; 491 AWF FSK.
      b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.

c. Compac Corporation; 110 and 111.
d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
2. Width: 3 inches.
3. Thickness: 6.5 mils.
4. Adhesion: 90 ounces force/inch in width.
5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

2.10 SECUREMENTS

A. Bands:
1. Products: Subject to compliance with requirements, provide one of the following:
a. ITW Insulation Systems; Gerrard Strapping and Seals.
b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with wing seal or closed seal.
B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
C. Wire: 0.062-inch soft-annealed, galvanized steel.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. C & F Wire.

PART 3 - EXECUTION

3.1 EXAMINATION

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A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
1. Verify that systems to be insulated have been tested and are free of defects.
2. Verify that surfaces to be insulated are clean and dry.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.
B. Surface Preparation: Clean and prepare surfaces to be insulated. Before insulating, apply a corrosion coating to insulated surfaces as follows:
1. Stainless Steel: Coat 300 series stainless steel with an epoxy primer 5 mils thick and an epoxy finish 5 mils thick if operating in a temperature range between 140 and 300 deg F. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
2. Carbon Steel: Coat carbon steel operating at a service temperature between 32 and 300 deg F with an epoxy coating. Consult coating manufacturer for appropriate coating materials and application methods for operating temperature range.
C. Coordinate insulation installation with the trade installing heat tracing. Comply with requirements for heat tracing that apply to insulation.
D. Mix insulating cements with clean potable water; if insulating cements are to be in contact with stainless-steel surfaces, use demineralized water.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.

B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
E. Install multiple layers of insulation with longitudinal and end seams staggered.
F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
G. Keep insulation materials dry during application and finishing.
H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
I. Install insulation with least number of joints practical.
J. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
    1. Install insulation continuously through hangers and around anchor attachments.
    2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
    3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
    4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
L. Install insulation with factory-applied jackets as follows:
    1. Draw jacket tight and smooth.
    2. Cover circumferential joints with 3-inch- wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
    3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at [2 inches] [4 inches] o.c.
        a. For below-ambient services, apply vapor-barrier mastic over staples.
    4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
    5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
P. For above-ambient services, do not install insulation to the following:
    1. Vibration-control devices.
    2. Testing agency labels and stamps.
    3. Nameplates and data plates.
    4. Manholes.
    5. Handholes.

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6. Cleanouts.

3.4 PENETRATIONS

A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
   4. Seal jacket to roof flashing with flashing sealant.

B. Insulation Installation at Underground Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with flashing sealant.

C. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
   1. Seal penetrations with flashing sealant.
   2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
   3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
   4. Seal jacket to wall flashing with flashing sealant.

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D. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.

E. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
   1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.

F. Insulation Installation at Floor Penetrations:
   1. Pipe: Install insulation continuously through floor penetrations.
   2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
   1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
   2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.
   3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.

4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.

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C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.

D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.6 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

A. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

B. Insulation Installation on Pipe Flanges:
   1. Install pipe insulation to outer diameter of pipe flange.
   2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
   4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

C. Insulation Installation on Pipe Fittings and Elbows:
   1. Install mitered sections of pipe insulation.
   2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

D. Insulation Installation on Valves and Pipe Specialties:
   1. Install preformed valve covers manufactured of same material as pipe insulation when available.
   2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
   3. Install insulation to flanges as specified for flange insulation application.
   4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

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3.7 FIELD-APPLIED JACKET INSTALLATION

A. Where FSK jackets are indicated, install as follows:
   1. Draw jacket material smooth and tight.
   2. Install lap or joint strips with same material as jacket.
   3. Secure jacket to insulation with manufacturer's recommended adhesive.
   4. Install jacket with 1-1/2-inch laps at longitudinal seams and 3-inch- wide joint strips at end joints.
   5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

3.8 FINISHES

A. Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
   1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
      a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL
A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
B. Perform tests and inspections.
C. Tests and Inspections:
1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.10 PIPING INSULATION SCHEDULE, GENERAL
A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
1. Drainage piping located in crawl spaces.
2. Underground piping.
3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

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3.11 INDOOR PIPING INSULATION SCHEDULE
A. Condensate and Equipment Drain Water:
1. All Pipe Sizes: Insulation shall be the following:
a. Flexible Elastomeric: 1 inch thick.

3.12 INDOOR, FIELD-APPLIED JACKET SCHEDULE
A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
B. If more than one material is listed, selection from materials listed is Contractor's option.
C. Piping, Concealed:
1. None.
D. Piping, Exposed:
1. None.

3.13 OUTDOOR, FIELD-APPLIED JACKET SCHEDULE
A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
B. If more than one material is listed, selection from materials listed is Contractor's option.
C. Piping, Concealed:
1. None.
D. Piping, Exposed:

1. Painted Aluminum, Corrugated: 0.024 inch thick.

3.14 UNDERGROUND, FIELD-INSTALLED INSULATION JACKET

A. For underground direct-buried piping applications, install underground direct-buried jacket over insulation material.

END OF SECTION 230719

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SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes control equipment for HVAC systems and components, including control components for terminal heating and cooling units not supplied with factory-wired controls.

B. Related Sections include the following:

1. Section 230993 "Sequence of Operations for HVAC Controls" for requirements that relate to this Section.

1.3 DEFINITIONS

A. DDC: Direct digital control.
B. I/O: Input/output.
C. MS/TP: Master slave/token passing.
D. PC: Personal computer.
E. PID: Proportional plus integral plus derivative.
F. RTD: Resistance temperature detector.

1.4 SYSTEM PERFORMANCE

A. Comply with the following performance requirements:

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1. Graphic Display: Display graphic with minimum 20 dynamic points with current data within 10 seconds.
2. Graphic Refresh: Update graphic with minimum 20 dynamic points with current data within 8 seconds.
3. Object Command: Reaction time of less than two seconds between operator command of a binary object and device reaction.
4. Object Scan: Transmit change of state and change of analog values to control units or workstation within six seconds.
5. Alarm Response Time: Annunciate alarm at workstation within 45 seconds. Multiple workstations must receive alarms within five seconds of each other.
6. Program Execution Frequency: Run capability of applications as often as five seconds, but selected consistent with mechanical process under control.
7. Performance: Programmable controllers shall execute DDC PID control loops, and scan and update process values and outputs at least once per second.
8. Reporting Accuracy and Stability of Control: Report values and maintain measured variables within tolerances as follows:
   a. Space Temperature: Plus or minus 1 deg F.
   b. Ducted Air Temperature: Plus or minus 1 deg F.
   c. Outside Air Temperature: Plus or minus 2 deg F.
   d. Dew Point Temperature: Plus or minus 3 deg F.
   e. Temperature Differential: Plus or minus 0.25 deg F.
   f. Relative Humidity: Plus or minus 5 percent.
   g. Airflow (Pressurized Spaces): Plus or minus 3 percent of full scale.
   h. Airflow (Measuring Stations): Plus or minus 5 percent of full scale.
   i. Airflow (Terminal): Plus or minus 10 percent of full scale.
   j. Air Pressure (Space): Plus or minus 0.01-inch wg.

k. Air Pressure (Ducts): Plus or minus 0.1-inch wg.
l. Carbon Monoxide: Plus or minus 5 percent of reading.
m. Carbon Dioxide: Plus or minus 50 ppm.
n. Electrical: Plus or minus 5 percent of reading.

1.5 SEQUENCE OF OPERATION

1.6 ACTION SUBMITTALS

A. Product Data: Include manufacturer's technical literature for each control device. Indicate dimensions, capacities, performance characteristics, electrical characteristics, finishes for materials, and installation and startup instructions for each type of product indicated.
1. DDC System Hardware: Bill of materials of equipment indicating quantity, manufacturer, and model number. Include technical data for operator workstation equipment, interface equipment, control units, transducers/transmitters, sensors, actuators, valves, relays/switches, control panels, and operator interface equipment.
2. Control System Software: Include technical data for operating system software, operator interface, color graphics, and other third-party applications.
3. Controlled Systems: Instrumentation list with element name, type of device, manufacturer, model number, and product data. Include written description of sequence of operation including schematic diagram.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
1. Bill of materials of equipment indicating quantity, manufacturer, and model number.
2. Schematic flow diagrams showing fans, pumps, coils, dampers, valves, and control devices.
3. Wiring Diagrams: Power, signal, and control wiring.
4. Details of control panel faces, including controls, instruments, and labeling.
5. Written description of sequence of operation.
6. Schedule of dampers including size, leakage, and flow characteristics.
7. Schedule of valves including flow characteristics.
8. DDC System Hardware:
a. Wiring diagrams for control units with termination numbers.
b. Schematic diagrams and floor plans for field sensors and control hardware.
c. Schematic diagrams for control, communication, and power wiring, showing trunk data conductors and wiring between operator workstation and control unit locations.
9. Control System Software: List of color graphics indicating monitored systems, data (connected and calculated) point addresses, output schedule, and operator notations.
10. Controlled Systems:
a. Schematic diagrams of each controlled system with control points labeled and control elements graphically shown, with wiring.
b. Scaled drawings showing mounting, routing, and wiring of elements including bases and special construction.
c. Written description of sequence of operation including schematic diagram.
d. Points list.

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1.7 INFORMATIONAL SUBMITTALS

A. Data Communications Protocol Certificates: Certify that each proposed DDC system component complies with ASHRAE 135.

B. Qualification Data: For Installer and manufacturer.

C. Software Upgrade Kit: For Owner to use in modifying software to suit future systems revisions or monitoring and control revisions.
D. Field quality-control test reports.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For HVAC instrumentation and control system to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
   1. Maintenance instructions and lists of spare parts for each type of control device and compressed-air station.
   2. Interconnection wiring diagrams with identified and numbered system components and devices.
   3. Keyboard illustrations and step-by-step procedures indexed for each operator function.
   4. Inspection period, cleaning methods, cleaning materials recommended, and calibration tolerances.
   5. Calibration records and list of set points.
B. Software and Firmware Operational Documentation: Include the following:
   1. Software operating and upgrade manuals.
   2. Program Software Backup: On a magnetic media or compact disc, complete with data files.
   3. Device address list.
   4. Printout of software application and graphic screens.
   5. Software license required by and installed for DDC workstations and control systems.

1.9 QUALITY ASSURANCE

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A. Installer Qualifications: Automatic control system manufacturer's authorized representative who is trained and approved for installation of system components required for this Project.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
C. Comply with ASHRAE 135 for DDC system components.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Factory-Mounted Components: Where control devices specified in this Section are indicated to be factory mounted on equipment, arrange for shipping of control devices to equipment manufacturer.
B. System Software: Update to latest version of software at Project completion.

1.11 COORDINATION

A. Coordinate location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation.
B. Coordinate equipment with Section 281600 "Intrusion Detection" to achieve compatibility with equipment that interfaces with that system and with building master clock.
C. Coordinate equipment with Section 281300 "Access Control" to achieve compatibility with equipment that interfaces with that system.
D. Coordinate equipment with Section 275313 "Clock Systems" to achieve compatibility with equipment that interfaces with that system.
E. Coordinate equipment with Section 284619 "PLC Electronic Detention Monitoring and Control Systems" to achieve compatibility with equipment that interfaces with that system.

F. Coordinate equipment with Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls" to achieve compatibility with equipment that interfaces with that system.
G. Coordinate equipment with Section 283111 "Digital, Addressable Fire-Alarm System" and Section 283112 "Zoned (DC Loop) Fire-Alarm System" to achieve compatibility with equipment that interfaces with that system.
H. Coordinate supply of conditioned electrical branch circuits for control units and operator workstation.
I. Coordinate equipment with Section 260913 "Electrical Power Monitoring and Control" to achieve compatibility of communication interfaces.
J. Coordinate equipment with Section 262416 "Panelboards" to achieve compatibility with starter coils and annunciation devices.
K. Coordinate equipment with Section 262419 "Motor-Control Centers" to achieve compatibility with motor starters and annunciation devices.
L. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

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2.2 CONTROL SYSTEM

A. Manufacturers:
   1. Sigler i-VU
B. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, and accessories to control mechanical systems.
C. Control system shall consist of sensors, indicators, actuators, final control elements, interface equipment, other apparatus, accessories, and software connected to distributed controllers operating in multiuser, multitasking environment on token-passing network and programmed to control mechanical systems. An operator workstation permits interface with the network via dynamic color graphics with each mechanical system, building floor plan, and control device depicted by point-and-click graphics.
D. Control system shall include the following:
   1. Building intrusion detection system specified in Section 281600 "Intrusion Detection."
   2. Building clock control system specified in Section 275313 "Clock Systems."
   3. Building lighting control system specified in Section 260943.13 "Addressable-Fixture Lighting Controls" and Section 260943.23 "Relay-Based Lighting Controls."
   4. Fire alarm system specified in Section 283111 "Digital, Addressable Fire-Alarm System" and Section 283112 "Zoned (DC Loop) Fire-Alarm System."

2.3 DDC EQUIPMENT

A. Operator Workstation: One PC-based microcomputer(s) with industry standard hardware.
   1. Application Software:
      a. I/O capability from operator station.
      b. System security for each operator via software password and access levels.
      c. Automatic system diagnostics; monitor system and report failures.

d. Database creation and support.
e. Automatic and manual database save and restore.
f. Dynamic color graphic displays.
g. Custom graphics generation and graphics library of HVAC equipment and symbols.
h. Alarm processing, messages, and reactions.
i. Trend logs retrievable in spreadsheets and database programs.
j. Alarm and event processing.
k. Object and property status and control.
l. Automatic restart of field equipment on restoration of power.
m. Data collection, reports, and logs. Include standard reports for the following:
    1) Current values of all objects.
    2) Current alarm summary.
    3) Disabled objects.
    4) Alarm lockout objects.
    5) Logs.
n. Custom report development.
o. Utility and weather reports.
p. Workstation application editors for controllers and schedules.
q. Maintenance management.

2. Custom Application Software:
    a. English language oriented.
    b. Full-screen character editor/programming environment.
    c. Allow development of independently executing program modules with debugging/simulation capability.
    d. Support conditional statements.
    e. Support floating-point arithmetic with mathematic functions.
    f. Contains predefined time variables.

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B. Control Units: Modular, comprising processor board with programmable, nonvolatile, random-access memory; local operator access and display panel; integral interface equipment; and backup power source.
1. Units monitor or control each I/O point; process information; execute commands from other control units, devices, and operator stations; and download from or upload to operator workstation or diagnostic terminal unit.
2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
    a. Global communications.
    b. Discrete/digital, analog, and pulse I/O.
    c. Monitoring, controlling, or addressing data points.
    d. Software applications, scheduling, and alarm processing.
    e. Testing and developing control algorithms without disrupting field hardware and controlled environment.
3. Standard Application Programs:
    a. Electric Control Programs: Demand limiting, duty cycling, automatic time scheduling, start/stop time optimization, night setback/setup, on-off control with differential sequencing, staggered start, antishort cycling, PID control, DDC with fine tuning, and trend logging.
    b. HVAC Control Programs: Optimal run time, supply-air reset, and enthalpy switchover.
    c. Chiller Control Programs: Control function of condenser-water reset, chilled-water reset, and equipment sequencing.

d. Programming Application Features: Include trend point; alarm processing and messaging; weekly, monthly, and annual scheduling; energy calculations; run-time totalization; and security access.
e. Remote communications.
f. Maintenance management.
g. Units of Measure: Inch-pound and SI (metric).

4. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
5. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

C. Local Control Units: Modular, comprising processor board with electronically programmable, nonvolatile, read-only memory; and backup power source.
1. Units monitor or control each I/O point, process information, and download from or upload to operator workstation or diagnostic terminal unit.
2. Stand-alone mode control functions operate regardless of network status. Functions include the following:
a. Global communications.
b. Discrete/digital, analog, and pulse I/O.
c. Monitoring, controlling, or addressing data points.
3. Local operator interface provides for download from or upload to operator workstation or diagnostic terminal unit.
4. ASHRAE 135 Compliance: Control units shall use ASHRAE 135 protocol and communicate using ISO 8802-3 (Ethernet) datalink/physical layer protocol.

D. I/O Interface: Hardwired inputs and outputs may tie into system through controllers. Protect points so that shorting will cause no damage to controllers.
1. Binary Inputs: Allow monitoring of on-off signals without external power.
2. Pulse Accumulation Inputs: Accept up to 10 pulses per second.
3. Analog Inputs: Allow monitoring of low-voltage (0- to 10-V dc), current (4 to 20 mA), or resistance signals.
4. Binary Outputs: Provide on-off or pulsed low-voltage signal, selectable for normally open or normally closed operation.
5. Analog Outputs: Provide modulating signal, either low voltage (0- to 10-V dc) or current (4 to 20 mA).
6. Tri-State Outputs: Provide two coordinated binary outputs for control of three-point, floating-type electronic actuators.
7. Universal I/Os: Provide software selectable binary or analog outputs.

E. Power Supplies: Transformers with Class 2 current-limiting type or overcurrent protection; limit connected loads to 80 percent of rated capacity. DC power supply shall match output current and voltage requirements and be full-wave rectifier type with the following:
1. Output ripple of 5.0 mV maximum peak to peak.
2. Combined 1 percent line and load regulation with 100-mic.sec. response time for 50 percent load changes.
3. Built-in overvoltage and overcurrent protection and be able to withstand 150 percent overload for at least 3 seconds without failure.

F. Power Line Filtering: Internal or external transient voltage and surge suppression for workstations or controllers with the following:
1. Minimum dielectric strength of 1000 V.
2. Maximum response time of 10 nanoseconds.
3. Minimum transverse-mode noise attenuation of 65 dB.
4. Minimum common-mode noise attenuation of 150 dB at 40 to 100 Hz.

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2.4 UNITARY CONTROLLERS

A. Unitized, capable of stand-alone operation with sufficient memory to support its operating system, database, and programming requirements, and with sufficient I/O capacity for the application.
   1. Configuration: Local keypad and display; diagnostic LEDs for power, communication, and processor; wiring termination to terminal strip or card connected with ribbon cable; memory with bios; and 72-hour battery backup.
   2. Operating System: Manage I/O communication to allow distributed controllers to share real and virtual object information and allow central monitoring and alarms. Perform scheduling with real-time clock. Perform automatic system diagnostics; monitor system and report failures.
   3. ASHRAE 135 Compliance: Communicate using read (execute and initiate) and write (execute and initiate) property services defined in ASHRAE 135. Reside on network using MS/TP datalink/physical layer protocol and have service communication port for connection to diagnostic terminal unit.
   4. Enclosure: Dustproof rated for operation at 32 to 120 deg F.
   5. Enclosure: Waterproof rated for operation at 40 to 150 deg F.

2.5 ALARM PANELS

A. Unitized cabinet with suitable brackets for wall or floor mounting. Fabricate of 0.06-inch-thick, furniture-quality steel or extruded-aluminum alloy, totally enclosed, with hinged doors and keyed lock and with manufacturer's standard shop-painted finish. Provide common keying for all panels.

B. Indicating light for each alarm point, single horn, acknowledge switch, and test switch, mounted on hinged cover.
   1. Alarm Condition: Indicating light flashes and horn sounds.
   2. Acknowledge Switch: Horn is silent and indicating light is steady.
   3. Second Alarm: Horn sounds and indicating light is steady.
   4. Alarm Condition Cleared: System is reset and indicating light is extinguished.
   5. Contacts in alarm panel allow remote monitoring by independent alarm company.

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2.6 ANALOG CONTROLLERS

A. Step Controllers: 6- or 10-stage type, with heavy-duty switching rated to handle loads and operated by electric motor.

B. Electric, Outdoor-Reset Controllers: Remote-bulb or bimetal rod-and-tube type, proportioning action with adjustable throttling range, adjustable set point, scale range minus 10 to plus 70 deg F, and single- or double-pole contacts.

C. Electronic Controllers: Wheatstone-bridge-amplifier type, in steel enclosure with provision for remote-resistance readjustment. Identify adjustments on controllers, including proportional band and authority.
   1. Single controllers can be integral with control motor if provided with accessible control readjustment potentiometer.

D. Fan-Speed Controllers: Solid-state model providing field-adjustable proportional control of motor speed from maximum to minimum of 55 percent and on-off action below minimum fan speed. Controller shall briefly apply full voltage, when motor is started, to rapidly bring motor up to minimum speed. Equip with filtered circuit to eliminate radio interference.

E. Receiver Controllers: Single- or multiple-input models with control-point adjustment, direct or reverse acting with mechanical set-point adjustment with locking device, proportional band adjustment, authority adjustment, and proportional control mode.
   1. Remote-control-point adjustment shall be plus or minus 20 percent of sensor span, input signal of 3 to 13 psig.

2. Proportional band shall extend from 2 to 20 percent for 5 psig.
3. Authority shall be 20 to 200 percent.
4. Air-supply pressure of 18 psig, input signal of 3 to 15 psig, and output signal of zero to supply pressure.
5. Gages: 1-1/2 inches in diameter, 2.5 percent wide-scale accuracy, and range to match transmitter input or output pressure.

2.7 TIME CLOCKS

A. Manufacturers:
1. ATC-Diversified Electronics.
2. Grasslin Controls Corporation.
3. Paragon Electric Co., Inc.
4. Precision Multiple Controls, Inc.
5. SSAC Inc.; ABB USA.
6. TCS/Basys Controls.
7. Theben AG - Lumilite Control Technology, Inc.
8. Time Mark Corporation.

B. Seven-day, programming-switch timer with synchronous-timing motor and seven-day dial; continuously charged, nickel-cadmium-battery-driven, eight-hour, power-failure carryover; multiple-switch trippers; minimum of two and maximum of eight signals per day with two normally open and two normally closed output contacts.

C. Solid-state, programmable time control with 8 separate programs each with up to 100 on-off operations; 1-second resolution; lithium battery backup; keyboard interface and manual override; individual on-off-auto switches for each program; 365-day calendar with 20 programmable holidays; choice of fail-safe operation for each program; system fault alarm; and communications package allowing networking of time controls and programming from PC.

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2.8 ELECTRONIC SENSORS

A. Description: Vibration and corrosion resistant; for wall, immersion, or duct mounting as required.

B. Thermistor Temperature Sensors and Transmitters:
1. Manufacturers:
a. BEC Controls Corporation.
b. Ebtron, Inc.
c. Heat-Timer Corporation.
d. I.T.M. Instruments Inc.
e. MAMAC Systems, Inc.
f. RDF Corporation.
2. Accuracy: Plus or minus 0.5 deg F at calibration point.
3. Wire: Twisted, shielded-pair cable.
4. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft..
5. Averaging Elements in Ducts: 18 inches long, rigid; use where prone to temperature stratification or where ducts are larger than 10 sq. ft..
6. Insertion Elements for Liquids: Brass or stainless-steel socket with minimum insertion length of 2-1/2 inches.
7. Room Sensor Cover Construction: Manufacturer's standard locking covers.
8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
9. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.

C. RTDs and Transmitters:

1. Manufacturers:
   a. BEC Controls Corporation.
   b. MAMAC Systems, Inc.
   c. RDF Corporation.
2. Accuracy: Plus or minus 0.2 percent at calibration point.
3. Wire: Twisted, shielded-pair cable.
4. Insertion Elements in Ducts: Single point, 8 inches long; use where not affected by temperature stratification or where ducts are smaller than 9 sq. ft..
5. Averaging Elements in Ducts: 18 inches long, rigid; use where prone to temperature stratification or where ducts are larger than 9 sq. ft.; length as required.
6. Insertion Elements for Liquids: Brass socket with minimum insertion length of 2-1/2 inches.
7. Room Sensor Cover Construction: Manufacturer's standard locking covers.
8. Outside-Air Sensors: Watertight inlet fitting, shielded from direct sunlight.
9. Room Security Sensors: Stainless-steel cover plate with insulated back and security screws.

D. Humidity Sensors: Bulk polymer sensor element.
   1. Manufacturers:
      a. BEC Controls Corporation.
      b. General Eastern Instruments.
      c. MAMAC Systems, Inc.
      d. ROTRONIC Instrument Corp.
      e. TCS/Basys Controls.
      f. Vaisala.
   2. Accuracy: 2 percent full range with linear output.
   3. Room Sensor Range: 20 to 80 percent relative humidity.
   4. Room Sensor Cover Construction: Manufacturer's standard locking covers.
   5. Duct Sensor: 20 to 80 percent relative humidity range with element guard and mounting plate.
   6. Outside-Air Sensor: 20 to 80 percent relative humidity range with mounting enclosure, suitable for operation at outdoor temperatures of minus 22 to plus 185 deg F.
   7. Duct and Sensors: With element guard and mounting plate, range of 0 to 100 percent relative humidity.

E. Pressure Transmitters/Transducers:
   1. Manufacturers:
      a. BEC Controls Corporation.
      b. General Eastern Instruments.
      c. MAMAC Systems, Inc.
      d. ROTRONIC Instrument Corp.
      e. TCS/Basys Controls.
      f. Vaisala.
   2. Static-Pressure Transmitter: Nondirectional sensor with suitable range for expected input, and temperature compensated.
      a. Accuracy: 2 percent of full scale with repeatability of 0.5 percent.
      b. Output: 4 to 20 mA.
      c. Building Static-Pressure Range: 0- to 0.25-inch wg.
      d. Duct Static-Pressure Range: 0- to 5-inch wg.
   3. Water Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure; linear output 4 to 20 mA.

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4. Water Differential-Pressure Transducers: Stainless-steel diaphragm construction, suitable for service; minimum 150-psig operating pressure and tested to 300-psig; linear output 4 to 20 mA.
5. Differential-Pressure Switch (Air or Water): Snap acting, with pilot-duty rating and with suitable scale range and differential.
6. Pressure Transmitters: Direct acting for gas, liquid, or steam service; range suitable for system; linear output 4 to 20 mA.

F. Room Sensor Cover Construction: Manufacturer's standard locking covers.

G. Room sensor accessories include the following:
1. Insulating Bases: For sensors located on exterior walls.
2. Guards: Locking; heavy-duty, transparent plastic; mounted on separate base where indicated in plans.

2.9 STATUS SENSORS

A. Status Inputs for Fans: Differential-pressure switch with pilot-duty rating and with adjustable range of 0- to 5-inch wg.

B. Status Inputs for Pumps: Differential-pressure switch with pilot-duty rating and with adjustable pressure-differential range of 8 to 60 psig, piped across pump.

C. Status Inputs for Electric Motors: Comply with ISA 50.00.01, current-sensing fixed- or split-core transformers with self-powered transmitter, adjustable and suitable for 175 percent of rated motor current.

D. Voltage Transmitter (100- to 600-V ac): Comply with ISA 50.00.01, single-loop, self-powered transmitter, adjustable, with suitable range and 1 percent full-scale accuracy.

E. Power Monitor: 3-phase type with disconnect/shorting switch assembly, listed voltage and current transformers, with pulse kilowatt hour output and 4- to 20-mA kW output, with maximum 2 percent error at 1.0 power factor and 2.5 percent error at 0.5 power factor.

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F. Current Switches: Self-powered, solid-state with adjustable trip current, selected to match current and system output requirements.

G. Electronic Valve/Damper Position Indicator: Visual scale indicating percent of travel and 2- to 10-V dc, feedback signal.

H. Water-Flow Switches: Bellows-actuated mercury or snap-acting type with pilot-duty rating, stainless-steel or bronze paddle, with appropriate range and differential adjustment, in NEMA 250, Type 1 enclosure.
1. Manufacturers:
a. BEC Controls Corporation.
b. I.T.M. Instruments Inc.

2.10 GAS DETECTION EQUIPMENT

A. Manufacturers:
1. Honeywell International Inc.; Home & Building Control.
2. Sensidyne, Inc.
3. TSI Incorporated.
4. Vulcain Inc.

B. Carbon Monoxide Detectors: Single or multichannel, dual-level detectors using solid-state plug-in sensors with a 3-year minimum life; suitable over a temperature range of 32 to 104 deg F; with 2 factory-calibrated alarm levels at 35 and 200 ppm.

C. Carbon Dioxide Sensor and Transmitter: Single detectors using solid-state infrared sensors; suitable over a temperature range of 23 to 130 deg F and calibrated for 0 to 2 percent, with continuous or averaged reading, 4- to 20-mA output;, for wall mounting.

D. Occupancy Sensor: Passive infrared, with time delay, daylight sensor lockout, sensitivity control, and 180-degree field of view with vertical sensing adjustment; for flush mounting.

2.11 FLOW MEASURING STATIONS

A. Thermal Airflow Station, Air Ducted/Plenum:

1. Manufacturers:
   a. Ebtron, Inc.
   b. Greenheck
   c. Ruskin
2. Description:
   a. Thermal airflow station with one or more sensor nodes mounted in a probe, and a remotely mounted microprocessor-based transmitter at each measurement location.
   b. Sensor nodes with one self-heated and one zero power bead-in-glass thermistor at each sensing node, using the principle of thermal dispersion.
3. Airflow Station Performance:
   a. Independent processing of up to 16 separately wired sensor node assemblies.
   b. Airflow rate and temperature of each sensor is equally weighted and averaged by the transmitter prior to output.
   c. Accuracy: Within 3 percent of reading for ducted applications, within 5 percent of reading for non-ducted applications, when installed in accordance with the manufacturer's recommended placement guidelines. Include the combined uncertainty of the sensor nodes and transmitter. For devices whose overall accuracy is based on individual accuracy specifications of the sensor probes and transmitter, demonstrate compliance with the accuracy requirement over the entire operating range.
4. Sensor Node and Probe Assemblies:
   a. Sensor Node Construction: Two bead-in-glass, hermetically sealed thermistors potted in a marine grade waterproof epoxy with sensor housings constructed of glass-filled polypropylene. Construct with only the thermistor located within the sensing node and all other electronic components outside the airstream. Epoxy or glass encapsulated chip thermistors or devices with exposed leads are not allowed.
   b. Performance rated and tested with a 100 percent survival rate in a 30-day saltwater and acid vapor test with written independent laboratory test results.
   c. Store sensor node airflow and temperature calibration data in a serial memory chip, in the cable connecting plug. Stored data does not require matching or adjustments to the transmitter in the field.
   d. Sensor Node Calibration: Individually calibrated at 16 measurement points to airflow standards directly calibrated at NIST to the NIST Laser Doppler Anemometer (LDA) primary velocity standard.
      1) Accuracy: Within 2 percent of reading over the entire calibrated airflow range of 0 to 5,000 fpm .
      2) Individually calibrate thermistor at a minimum of 3 temperatures to NIST-traceable temperature standards.
   e. Sensing Node Temperature Accuracy: Within 0.15 deg F over an operating range of minus 20 deg F to plus 160 deg F and humidity range of 0 to 100 percent RH.
   f. Provide the number of independent sensor nodes as follows:

      1) For Duct/Plenum Area up to 0.5 sq. ft. : 1.
      2) For Duct/Plenum Area Greater than 0.5 through 1.0 sq. ft. : 2.
      3) For Duct/Plenum Area Greater than 1.0 through 2.0 sq. ft. : 4.
      4) For Duct/Plenum Area Greater than 2.0 through 4.0 sq. ft. : 6.
      5) For Duct/Plenum Area Greater than 4.0 through 8.0 sq. ft. : 8.
      6) For Duct/Plenum Area Greater than 8.0 through 12.0 sq. ft. : 12.
      7) For Duct/Plenum Area Greater than 12.0 through 14.0 sq. ft. : 14.

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8) For Duct/Plenum Area Greater than 14.0 sq. ft. : 16.

g. For an aspect ratio of 1.5 or less, and an area of 25 sq. ft. or greater, 4 probes are required.

h. Sensor Probe Construction: Gold anodized, 6063 aluminum alloy tube, with each sensor probe containing one or more independently wired sensing nodes.

i. Sensor Probe Mounting Bracket Construction: Type 304 stainless steel.

j. Internal Probe Wiring: Kynar coated copper between the connecting cable and sensor nodes.

k. Internal Probe Wiring Connections: Solder joints and spot welds, sealed and protected from the elements, so that direct exposure to water will not affect instrument operation.

l. Sensor Probe Jacket: Integral, FEP jacket, plenum rated CMP/CL2P, UL/cUL-Listed cable, rated for exposures from minus 67 deg F to plus 392 deg F , and for continuous and direct UV exposure.

m. Sensor Probe Cable Connector Plug: Gold plated pins for connection to the transmitter.

5. Transmitter:

a. Transmitter determines the average airflow rate and temperature of connected sensor nodes in an array for a single location.

b. User Interface: 16-character, alpha-numeric, LCD display, with two field selectable analog output signals and network output capability.

1) Two field selectable 0-5/0-10 V dc, or 4-20 mA, scalable, isolated, over-current protected analog output signals. The first output (AO1) provides the total airflow rate. The second output (AO2) is field configurable for temperature or low and/or high airflow set point (user defined) or system status alarm. The RS-485 (BACnet MS/TP, or Modbus RTU) network connection provides the average airflow rate, temperature, high and/or low airflow set point alarm, system status alarm, individual sensor node airflow rates and individual sensor node temperatures.

c. Printed Circuit Board Interconnects: Gold plated edge fingers, receptacle plug pins, and printed circuit board test points.

d. Printed Circuit Boards: Electroless nickel immersion gold (ENIG) plated.

e. Integrated Circuitry: Temperature rated, industrial-grade.

f. Integration Buffers: Separate integration buffers for display of airflow output, airflow signal output (analog and network), and individual sensor output (IR-interface).

g. Transmitter Features and Functions:

1) High and/or low airflow alarm with user-defined set point and percent of set point tolerance.

2) Manual or automatic alarm reset, and low-limit cutoff value may be selected to disable the alarm.

3) Alarm delay function, field defined.

4) Sensor node malfunction via the system status alarm and ignore the sensor node that is in a fault condition.

5) Field configuration, diagnostics, and Field Output Adjustment Wizard that allows for a one- or two-point field adjustment to factory calibration for installations that require adjustment.

6) Automatic reset after power disruption, transients, and brown-outs through a watchdog timer circuit.

7) Operating temperature range of minus 20 deg F to plus 120 deg F and humidity range of 5 to 95 percent RH.

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8) Electrical Power Requirement: 24-V ac (between 22.8- and 26.4-V ac under load) at 20-VA maximum, using a switching power supply that is over-current and over-voltage protected.

6. Listing and Certifications:
   a. UL/cUL Listing: UL/cUL 873 Listed as an assembly.
   b. BTL Listing: BTL Listed, network-capable, airflow stations supplied with RS-485 interface and BACnet protocol.

2.12 ACTUATORS

A. Electric Motors: Size to operate with sufficient reserve power to provide smooth modulating action or two-position action.
   1. Comply with requirements in Section 230513 "Common Motor Requirements for HVAC Equipment."
   2. Permanent Split-Capacitor or Shaded-Pole Type: Gear trains completely oil immersed and sealed. Equip spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.
   3. Nonspring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
   4. Spring-Return Motors for Valves Larger Than NPS 2-1/2: Size for running and breakaway torque of 150 in. x lbf.
   5. Nonspring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running torque of 150 in. x lbf and breakaway torque of 300 in. x lbf.
   6. Spring-Return Motors for Dampers Larger Than 25 Sq. Ft.: Size for running and breakaway torque of 150 in. x lbf.

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B. Electronic Actuators: Direct-coupled type designed for minimum 60,000 full-stroke cycles at rated torque.
   1. Manufacturers:
      a. Belimo Aircontrols (USA), Inc.
   2. Valves: Size for torque required for valve close off at maximum pump differential pressure.
   3. Dampers: Size for running torque calculated as follows:
      a. Parallel-Blade Damper with Edge Seals: 7 inch-lb/sq. ft. of damper.
      b. Opposed-Blade Damper with Edge Seals: 5 inch-lb/sq. ft. of damper.
      c. Parallel-Blade Damper without Edge Seals: 4 inch-lb/sq. ft of damper.
      d. Opposed-Blade Damper without Edge Seals: 3 inch-lb/sq. ft. of damper.
      e. Dampers with 2- to 3-Inch wg of Pressure Drop or Face Velocities of 1000 to 2500 fpm: Increase running torque by 1.5.
      f. Dampers with 3- to 4-Inch wg of Pressure Drop or Face Velocities of 2500 to 3000 fpm: Increase running torque by 2.0.
   4. Coupling: V-bolt and V-shaped, toothed cradle.
   5. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
   6. Fail-Safe Operation: Mechanical, spring-return mechanism. Provide external, manual gear release on nonspring-return actuators.
   7. Power Requirements (Two-Position Spring Return): 24-V ac.
   8. Power Requirements (Modulating): Maximum 10 VA at 24-V ac or 8 W at 24-V dc.
   9. Proportional Signal: 2- to 10-V dc or 4 to 20 mA, and 2- to 10-V dc position feedback signal.
   10. Temperature Rating: Minus 22 to plus 122 deg F.
   11. Temperature Rating (Smoke Dampers): Minus 22 to plus 250 deg F.
   12. Run Time: 30 seconds.

2.13 DAMPERS

A. Manufacturers:
   1. Air Balance Inc.
   2. Don Park Inc.; Autodamp Div.
   3. TAMCO (T. A. Morrison & Co. Inc.).
   4. United Enertech Corp.
   5. Vent Products Company, Inc.

B. Dampers: AMCA-rated, parallel-blade design; 0.108-inch- minimum thick, galvanized-steel or 0.125-inch- minimum thick, extruded-aluminum frames with holes for duct mounting; damper blades shall not be less than 0.064-inch- thick galvanized steel with maximum blade width of 8 inches and length of 48 inches.
   1. Secure blades to 1/2-inch- diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
   2. Operating Temperature Range: From minus 40 to plus 200 deg F.
   3. Edge Seals, Standard Pressure Applications: Closed-cell neoprene.
   4. Edge Seals, Low-Leakage Applications: Use inflatable blade edging or replaceable rubber blade seals and spring-loaded stainless-steel side seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is held by torque of 50 in. x lbf; when tested according to AMCA 500D.

2.14 CONTROL CABLE

A. Electronic and fiber-optic cables for control wiring are specified in Section 271500 "Communications Horizontal Cabling."

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PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that power supply is available to control units and operator workstation.
B. Verify duct-, pipe-, and equipment-mounted devices are installed before proceeding with installation.

3.2 INSTALLATION

A. Install software in control units and operator workstation(s). Implement all features of programs to specified requirements and as appropriate to sequence of operation.
B. Connect and configure equipment and software to achieve sequence of operation specified.
C. Verify location of thermostats, humidistats, and other exposed control sensors with Drawings and room details before installation.
   1. Install averaging elements in ducts and plenums in crossing or zigzag pattern.
D. Install guards on thermostats in the following locations:
   1. Entrances.
   2. Public areas.
   3. Where indicated.
E. Install automatic dampers according to Section 233300 "Air Duct Accessories."
F. Install damper motors on outside of duct in warm areas, not in locations exposed to outdoor temperatures.
G. Install labels and nameplates to identify control components according to Section 230553 "Identification for HVAC Piping and Equipment."
H. Install hydronic instrument wells, valves, and other accessories according to Section 232116 Hydronic Piping Specialties."

I. Install steam and condensate instrument wells, valves, and other accessories according toSection 232216 Steam and Condensate Piping Specialties."
J. Install refrigerant instrument wells, valves, and other accessories according to Section 232300 "Refrigerant Piping."
K. Install duct volume-control dampers according to Section 233113 "Metal Ducts" and Section 233116 "Nonmetal Ducts."
L. Install electronic and fiber-optic cables according to Section 271500 "Communications Horizontal Cabling."

3.3 ELECTRICAL WIRING AND CONNECTION INSTALLATION

A. Install raceways, boxes, and cabinets according to Section 260533 "Raceways and Boxes for Electrical Systems."
B. Install building wire and cable according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
C. Install signal and communication cable according to Section 271500 "Communications Horizontal Cabling."
    1. Conceal cable, except in mechanical rooms and areas where other conduit and piping are exposed.
    2. Install exposed cable in raceway.
    3. Install concealed cable in raceway.
    4. Bundle and harness multiconductor instrument cable in place of single cables where several cables follow a common path.
    5. Fasten flexible conductors, bridging cabinets and doors, along hinge side; protect against abrasion. Tie and support conductors.
    6. Number-code or color-code conductors for future identification and service of control system, except local individual room control cables.
    7. Install wire and cable with sufficient slack and flexible connections to allow for vibration of piping and equipment.
D. Connect manual-reset limit controls independent of manual-control switch positions. Automatic duct heater resets may be connected in interlock circuit of power controllers.
E. Connect hand-off-auto selector switches to override automatic interlock controls when switch is in hand position.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.
B. Perform the following field tests and inspections and prepare test reports:
    1. Operational Test: After electrical circuitry has been energized, start units to confirm proper unit operation. Remove and replace malfunctioning units and retest.
    2. Test and adjust controls and safeties.
    3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
    4. Pressure test control air piping at 30 psig or 1.5 times the operating pressure for 24 hours, with maximum 5-psig loss.
    5. Pressure test high-pressure control air piping at 150 psig and low-pressure control air piping at 30 psig for 2 hours, with maximum 1-psig loss.
    6. Test calibration of electronic controllers by disconnecting input sensors and stimulating operation with compatible signal generator.
    7. Test each point through its full operating range to verify that safety and operating control set points are as required.

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8. Test each control loop to verify stable mode of operation and compliance with sequence of operation. Adjust PID actions.
9. Test each system for compliance with sequence of operation.
10. Test software and hardware interlocks.

C. DDC Verification:
1. Verify that instruments are installed before calibration, testing, and loop or leak checks.
2. Check instruments for proper location and accessibility.
3. Check instrument installation for direction of flow, elevation, orientation, insertion depth, and other applicable considerations.
4. Check instrument tubing for proper fittings, slope, material, and support.
5. Check installation of air supply for each instrument.
6. Check flow instruments. Inspect tag number and line and bore size, and verify that inlet side is identified and that meters are installed correctly.
7. Check pressure instruments, piping slope, installation of valve manifold, and self-contained pressure regulators.
8. Check temperature instruments and material and length of sensing elements.
9. Check control valves. Verify that they are in correct direction.
10. Check air-operated dampers. Verify that pressure gages are provided and that proper blade alignment, either parallel or opposed, has been provided.
11. Check DDC system as follows:
    a. Verify that DDC controller power supply is from emergency power supply, if applicable.
    b. Verify that wires at control panels are tagged with their service designation and approved tagging system.
    c. Verify that spare I/O capacity has been provided.
    d. Verify that DDC controllers are protected from power supply surges.

D. Replace damaged or malfunctioning controls and equipment and repeat testing procedures.

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3.5 ADJUSTING

A. Calibrating and Adjusting:
1. Calibrate instruments.
2. Make three-point calibration test for both linearity and accuracy for each analog instrument.
3. Calibrate equipment and procedures using manufacturer's written recommendations and instruction manuals. Use test equipment with accuracy at least double that of instrument being calibrated.
4. Control System Inputs and Outputs:
    a. Check analog inputs at 0, 50, and 100 percent of span.
    b. Check analog outputs using milliampere meter at 0, 50, and 100 percent output.
    c. Check digital inputs using jumper wire.
    d. Check digital outputs using ohmmeter to test for contact making or breaking.
    e. Check resistance temperature inputs at 0, 50, and 100 percent of span using a precision-resistant source.
5. Flow:
    a. Set differential pressure flow transmitters for 0 and 100 percent values with 3-point calibration accomplished at 50, 90, and 100 percent of span.
    b. Manually operate flow switches to verify that they make or break contact.
6. Pressure:
    a. Calibrate pressure transmitters at 0, 50, and 100 percent of span.
    b. Calibrate pressure switches to make or break contacts, with adjustable differential set at minimum.

7. Temperature:
   a. Calibrate resistance temperature transmitters at 0, 50, and 100 percent of span using a precision-resistance source.
   b. Calibrate temperature switches to make or break contacts.
8. Stroke and adjust control valves and dampers without positioners, following the manufacturer's recommended procedure, so that valve or damper is 100 percent open and closed.
9. Stroke and adjust control valves and dampers with positioners, following manufacturer's recommended procedure, so that valve and damper is 0, 50, and 100 percent closed.
10. Provide diagnostic and test instruments for calibration and adjustment of system.
11. Provide written description of procedures and equipment for calibrating each type of instrument. Submit procedures review and approval before initiating startup procedures.

B. Adjust initial temperature and humidity set points.

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to three visits to Project during other than normal occupancy hours for this purpose.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain HVAC instrumentation and controls. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 230900

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SECTION 23 09 93 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes control sequences for HVAC systems, subsystems, and equipment.

B. Related Sections include the following:

1. Section 230900 "Instrumentation and Control for HVAC" for control equipment and devices and for submittal requirements.

1.3 DEFINITIONS

A. DDC: Direct digital control.

B. VAV: Variable air volume.

1.4 AIR-HANDLING-UNIT CONTROL SEQUENCES

A. Start and Stop Supply Fan(s):

1. Enable: Freeze Protection:
   a. Input Device: Duct-mounted averaging element thermostat, located before supply fan.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if duct temperature is above 37 deg F; signal alarm if fan fails to start as commanded.
2. Enable: High-Temperature Protection:
   a. Input Device: Duct-mounted thermostat, located in return air.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if duct temperature is below 300 deg F.
3. Enable: Smoke Control:
   a. Input Device: Duct-mounted smoke detector, located in supply air.
   b. Output Device: Hard wired through motor starter; DDC system alarm.
   c. Action: Allow start if duct is free of products of combustion.
4. Initiate: Occupied Time Schedule:
   a. Input Device: DDC system time schedule.
   b. Output Device: Binary output to motor starter.
   c. Action: Energize fan(s).
5. Initiate: Unoccupied Time Schedule:
   a. Input Device: DDC system demand.
   b. Output Device: Binary output to motor starter.
   c. Action: Energize fan(s).
6. Unoccupied Ventilation:
   a. Input Device: DDC system time schedule and output.
   b. Output Device: DDC system binary output to motor starter.
   c. Action: Cycle fan(s) during unoccupied periods.
7. Display: Supply-fan on-off indication.

B. Mixed-Air Control:

1. Occupied Time Schedule:
   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system output.
   c. Action: Enable control.
2. Minimum Position:

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a. Input Device: DDC system time schedule.
b. Output Device: DDC system analog output to modulating damper actuator(s).
c. Action: Open outdoor-air dampers to minimum position.

3. Heating Reset:
   a. Input Device: DDC system software.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Set outdoor-air dampers to minimum position.
4. Mixed-Air Temperature:
   a. Input Device: Electronic temperature sensor.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Modulate outdoor-, return-, and relief-air dampers to maintain air temperature set point of 55 deg F.
5. Unoccupied Time Schedule:
   a. Input Device: DDC system time schedule.
   b. Output Device: DDC system analog output to modulating damper actuator(s).
   c. Action: Position outdoor- and relief-air dampers closed and return-air dampers open.
6. Display:
   a. Mixed-air-temperature indication.
   b. Mixed-air-temperature set point.
   c. Mixed-air damper position.

C. Coordination of Air-Handling Unit Sequences: Ensure that preheat, mixed-air, heating-coil, and cooling-coil controls have common inputs and do not overlap in function.

D. Operator Station Display: Indicate the following on operator workstation display terminal:
1. DDC system graphic.
2. DDC system on-off indication.
3. DDC system occupied/unoccupied mode.
4. Outdoor-air-temperature indication.
5. Supply-fan on-off indication.
6. Supply-fan airflow rate.
7. Mixed-air damper position.
8. Fan-discharge air-temperature indication.
9. Fan-discharge air-temperature set point.
10. Heating-coil air-temperature indication.
11. Heating-coil air-temperature set point.
12. Cooling-coil air-temperature indication.
13. Cooling-coil air-temperature set point.
14. Room temperature indication.
15. Room temperature set point.

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1.5 VENTILATION SEQUENCES

A. Exhaust Fan: Room thermostat cycles fan.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230993

SECTION 23 23 00 – REFRIGERANT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes refrigerant piping used for air-conditioning applications.

1.3 PERFORMANCE REQUIREMENTS

A. Line Test Pressure for Refrigerant R-454B:
   1. Suction Lines for Air-Conditioning Applications: 300 psig.
   2. Hot-Gas and Liquid Lines: 535 psig.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Show layout of refrigerant piping and specialties, including pipe, tube, and fitting sizes, flow capacities, valve arrangements and locations, slopes of horizontal runs, oil traps, double risers, wall and floor penetrations, and equipment connection details. Show interface and spatial relationships between piping and equipment.

   1. Refrigerant piping indicated on Drawings is schematic only. Size piping and design actual piping layout, including oil traps, double risers, specialties, and pipe and tube sizes to accommodate, as a minimum, equipment provided, elevation difference between compressor and evaporator, and length of piping to ensure proper operation and compliance with warranties of connected equipment.

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1.5 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."
B. Comply with ASHRAE 15, "Safety Code for Refrigeration Systems."
C. Comply with ASME B31.5, "Refrigeration Piping and Heat Transfer Components."

1.7 PRODUCT STORAGE AND HANDLING

A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

PART 2 - PRODUCTS

2.1 COPPER TUBE AND FITTINGS

A. Copper Tube: ASTM B 88, Type L.
B. Wrought-Copper Fittings: ASME B16.22.
C. Wrought-Copper Unions: ASME B16.22.
D. Brazing Filler Metals: AWS A5.8.

2.2 REFRIGERANTS

A. ASHRAE 34, R-454B

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS FOR REFRIGERANT R-454b

A. Suction Lines for Conventional Air-Conditioning Applications: Copper, Type L, drawn-temper tubing and wrought-copper fittings with brazed joints.

B. Hot-Gas and Liquid Lines: Copper, Type L, annealed- or drawn-temper tubing and wrought-copper fittings with brazed joints.

3.2 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems; indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

B. Install refrigerant piping according to ASHRAE 15.

C. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping adjacent to machines to allow service and maintenance.

G. Install piping free of sags and bends.

H. Install fittings for changes in direction and branch connections.

I. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.

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J. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection. Install access doors or panels as specified in Section 083113 "Access Doors and Frames" if valves or equipment requiring maintenance is concealed behind finished surfaces.

K. Install refrigerant piping in rigid or flexible conduit in locations where exposed to mechanical injury.

L. Slope refrigerant piping as follows:
   1. Install horizontal hot-gas discharge piping with a uniform slope downward away from compressor.
   2. Install horizontal suction lines with a uniform slope downward to compressor.
   3. Liquid lines may be installed level.

M. When brazing, remove solenoid-valve coils and sight glasses; also remove valve stems, seats, and packing, and accessible internal parts of refrigerant specialties. Do not apply heat near expansion-valve bulb.

N. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.

O. Identify refrigerant piping and valves according to Section 230553 "Identification for HVAC Piping and Equipment."

P. Install sleeves for piping penetrations of walls, ceilings, and floors.

Q. Install sleeve seals for piping penetrations of concrete walls and slabs.

R. Install escutcheons for piping penetrations of walls, ceilings, and floors.

3.3 PIPE JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.

C. Fill pipe and fittings with an inert gas (nitrogen or carbon dioxide), during brazing or welding, to prevent scale formation.
D. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   1. Use Type BcuP, copper-phosphorus alloy for joining copper socket fittings with copper pipe.
   2. Use Type BAg, cadmium-free silver alloy for joining copper with bronze or steel.

3.4 HANGERS AND SUPPORTS
A. Hanger, support, and anchor products are specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
B. Install the following pipe attachments:
   1. Adjustable steel clevis hangers for individual horizontal runs less than 20 feet long.
   2. Roller hangers and spring hangers for individual horizontal runs 20 feet or longer.
   3. Pipe Roller: MSS SP-58, Type 44 for multiple horizontal piping 20 feet or longer, supported on a trapeze.
   4. Spring hangers to support vertical runs.
   5. Copper-clad hangers and supports for hangers and supports in direct contact with copper pipe.
C. Install hangers for copper tubing with the following maximum spacing and minimum rod sizes:
   1. NPS 1/2: Maximum span, 60 inches; minimum rod size, 1/4 inch.
   2. NPS 5/8: Maximum span, 60 inches; minimum rod size, 1/4 inch.
   3. NPS 1: Maximum span, 72 inches; minimum rod size, 1/4 inch.
   4. NPS 1-1/4: Maximum span, 96 inches; minimum rod size, 3/8 inch.
   5. NPS 1-1/2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
   6. NPS 2: Maximum span, 96 inches; minimum rod size, 3/8 inch.
   7. NPS 2-1/2: Maximum span, 108 inches; minimum rod size, 3/8 inch.
   8. NPS 3: Maximum span, 10 feet; minimum rod size, 3/8 inch.
   9. NPS 4: Maximum span, 12 feet; minimum rod size, 1/2 inch.
D. Support multifloor vertical runs at least at each floor.

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3.5 FIELD QUALITY CONTROL
A. Perform tests and inspections and prepare test reports.
B. Tests and Inspections:
   1. Comply with ASME B31.5, Chapter VI.
   2. Test refrigerant piping, specialties, and receivers. Isolate compressor, condenser, evaporator, and safety devices from test pressure if they are not rated above the test pressure.
   3. Test high- and low-pressure side piping of each system separately at not less than the pressures indicated in Part 1 "Performance Requirements" Article.
      a. Fill system with nitrogen to the required test pressure.
      b. System shall maintain test pressure at the manifold gage throughout duration of test.
      c. Test joints and fittings with electronic leak detector or by brushing a small amount of soap and glycerin solution over joints.
      d. Remake leaking joints using new materials, and retest until satisfactory results are achieved.

3.6 SYSTEM CHARGING
A. Charge system using the following procedures:
   1. Install core in filter dryers after leak test but before evacuation.

2. Evacuate entire refrigerant system with a vacuum pump to 500 micrometers. If vacuum holds for 12 hours, system is ready for charging.
3. Break vacuum with refrigerant gas, allowing pressure to build up to 2 psig.
4. Charge system with a new filter-dryer core in charging line.

3.7 ADJUSTING

A. Adjust thermostatic expansion valve to obtain proper evaporator superheat.
B. Adjust high- and low-pressure switch settings to avoid short cycling in response to fluctuating suction pressure.
C. Adjust set-point temperature of air-conditioning to the system design temperature.
D. Perform the following adjustments before operating the refrigeration system, according to manufacturer's written instructions:
   1. Verify that compressor oil level is correct.
   2. Open compressor suction and discharge valves.
   3. Open refrigerant valves except bypass valves that are used for other purposes.
   4. Check open compressor-motor alignment and verify lubrication for motors and bearings.
E. Replace core of replaceable filter dryer after system has been adjusted and after design flow rates and pressures are established.

END OF SECTION 232300

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SECTION 23 31 13 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Single-wall rectangular ducts and fittings.
   2. Single-wall round ducts and fittings.
   3. Sheet metal materials.
   4. Duct liner.
   5. Sealants and gaskets.
   6. Hangers and supports.
   7. Seismic-restraint devices.

B. Related Sections:
   1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
   2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7.

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B. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of the following products:
   1. Liners and adhesives.
   2. Sealants and gaskets.
   3. Seismic-restraint devices.

B. Shop Drawings:
   1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
   2. Factory- and shop-fabricated ducts and fittings.
   3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
   4. Elevation of top of ducts.
   5. Dimensions of main duct runs from building grid lines.
   6. Fittings.
   7. Reinforcement and spacing.
   8. Seam and joint construction.
   9. Penetrations through fire-rated and other partitions.
   10. Equipment installation based on equipment being used on Project.
   11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
   12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
   2. Suspended ceiling components.
   3. Structural members to which duct will be attached.
   4. Size and location of initial access modules for acoustical tile.
   5. Penetrations of smoke barriers and fire-rated construction.
   6. Items penetrating finished ceiling including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Sprinklers.
      e. Access panels.
      f. Perimeter moldings.

B. Welding certificates.

C. Field quality-control reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
   2. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

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C. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."

D. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable

sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.2 SINGLE-WALL ROUND DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Lindab Inc.
      b. McGill AirFlow LLC.
      c. SEMCO Incorporated.
      d. Sheet Metal Connectors, Inc.
      e. Spiral Manufacturing Co., Inc.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
   1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
   1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.

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D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2.3 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   1. Galvanized Coating Designation: G90.
   2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
   1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.4 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. CertainTeed Corporation; Insulation Group.
   b. Johns Manville.
   c. Knauf Insulation.
   d. Owens Corning.
2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916.
   a. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
   b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

B. Insulation Pins and Washers:
1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
2. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel; with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

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C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
3. Butt transverse joints without gaps, and coat joint with adhesive.
4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
   a. Fan discharges.
   b. Intervals of lined duct preceding unlined duct.
   c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.

a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall open area of 23 percent.

10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.5 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.

B. Two-Part Tape Sealing System:
1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
2. Tape Width: 4 inches.
3. Sealant: Modified styrene acrylic.
4. Water resistant.
5. Mold and mildew resistant.
6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
7. Service: Indoor and outdoor.
8. Service Temperature: Minus 40 to plus 200 deg F.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
11. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Water-Based Joint and Seam Sealant:
1. Application Method: Brush on.
2. Solids Content: Minimum 65 percent.
3. Shore A Hardness: Minimum 20.
4. Water resistant.
5. Mold and mildew resistant.
6. VOC: Maximum 75 g/L (less water).
7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
8. Service: Indoor or outdoor.
9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.

D. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
2. Type: S.
3. Grade: NS.
4. Class: 25.
5. Use: O.
6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

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E. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
F. Round Duct Joint O-Ring Seals:
   1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
   2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
   3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

2.6 HANGERS AND SUPPORTS
A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
C. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
D. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
E. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
F. Trapeze and Riser Supports:
   1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.

2.7 SEISMIC-RESTRAINT DEVICES
A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Cooper B-Line, Inc.; a division of Cooper Industries.
   2. Ductmate Industries, Inc.
   3. Hilti Corp.
   4. Mason Industries.
   5. TOLCO; a brand of NIBCO INC.
   6. Unistrut Corporation; Tyco International, Ltd.

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B. General Requirements for Restraint Components: Rated strengths, features, and applications shall be as defined in reports by the Office of Statewide Health Planning and Development for the State of California.
   1. Structural Safety Factor: Allowable strength in tension, shear, and pullout force of components shall be at least four times the maximum seismic forces to which they will be subjected.
C. Channel Support System: Shop- or field-fabricated support assembly made of slotted steel channels rated in tension, compression, and torsion forces and with accessories for attachment to braced component at one end and to building structure at the other end. Include matching components and corrosion-resistant coating.
D. Restraint Cables: ASTM A 603, galvanized-steel cables with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for restraining cable service; and with an automatic-locking and clamping device or double-cable clips.
E. Hanger Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or Reinforcing steel angle clamped to hanger rod.
F. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.

C. Install round ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

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K. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.

L. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "IAQ Guidelines for Occupied Buildings Under Construction," Appendix G, "Duct Cleanliness for New Construction Guidelines."

3.2 INSTALLATION OF EXPOSED DUCTWORK

A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.

B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.

C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.

D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of fittings, hangers and supports, duct accessories, and air outlets.

E. Repair or replace damaged sections and finished work that does not comply with these requirements.

3.3 DUCT SEALING

A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible":

1. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

2. Outdoor, Supply-Air Ducts: Seal Class A.
3. Outdoor, Exhaust Ducts: Seal Class C.
4. Outdoor, Return-Air Ducts: Seal Class C.
5. Unconditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class B.
6. Unconditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class A.
7. Unconditioned Space, Exhaust Ducts: Seal Class C.
8. Unconditioned Space, Return-Air Ducts: Seal Class B.
9. Conditioned Space, Supply-Air Ducts in Pressure Classes 2-Inch wg and Lower: Seal Class C.
10. Conditioned Space, Supply-Air Ducts in Pressure Classes Higher Than 2-Inch wg: Seal Class B.
11. Conditioned Space, Exhaust Ducts: Seal Class B.
12. Conditioned Space, Return-Air Ducts: Seal Class C.

3.4 HANGER AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."

B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
   1. Where practical, install concrete inserts before placing concrete.
   2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
   3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
   4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
   5. Do not use powder-actuated concrete fasteners for seismic restraints.

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C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.

D. Hangers Exposed to View: Threaded rod and angle or channel supports.

E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.

F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.5 SEISMIC-RESTRAINT-DEVICE INSTALLATION

A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems" and ASCE/SEI 7.
   1. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
   2. Brace a change of direction longer than 12 feet.

B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.

C. Install cables so they do not bend across edges of adjacent equipment or building structure.

D. Install cable restraints on ducts that are suspended with vibration isolators.

E. Install seismic-restraint devices using methods approved by the Office of Statewide Health Planning and Development for the State of California.

F. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.

G. Drilling for and Setting Anchors:

1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
4. Set anchors to manufacturer's recommended torque, using a torque wrench.
5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

3.6 CONNECTIONS

A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

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3.7 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

3.8 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:

1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
2. Test the following systems:
   a. Ducts with a Pressure Class Higher Than 3-Inch wg: Test representative duct sections totaling no less than 25 percent of total installed duct area for each designated pressure class.
   b. Supply, Return, Outdoor Air, Exhaust Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 100 percent of total installed duct area for each designated pressure class.
3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before applying external insulation.
5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
6. Give seven days' advance notice for testing.

C. Duct System Cleanliness Tests:

1. Visually inspect duct system to ensure that no visible contaminants are present.
2. Test sections of metal duct system, chosen randomly by Owner, for cleanliness according to "Vacuum Test" in NADCA ACR, "Assessment, Cleaning and Restoration of HVAC Systems."
    a. Acceptable Cleanliness Level: Net weight of debris collected on the filter media shall not exceed 0.75 mg/100 sq. cm.

D. Duct system will be considered defective if it does not pass tests and inspections.
E. Prepare test and inspection reports.

3.9 DUCT CLEANING

A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
B. Use service openings for entry and inspection.
    1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
    2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
    3. Remove and reinstall ceiling to gain access during the cleaning process.
C. Particulate Collection and Odor Control:
    1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
    2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
D. Clean the following components by removing surface contaminants and deposits:
    1. Air outlets and inlets (registers, grilles, and diffusers).
    2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
    3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
    4. Coils and related components.
    5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
    6. Supply-air ducts, dampers, actuators, and turning vanes.
    7. Dedicated exhaust and ventilation components and makeup air systems.
E. Mechanical Cleaning Methodology:
    1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
    2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
    3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
    4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
    5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.

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6. Provide drainage and cleanup for wash-down procedures.
7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

3.10 START UP

A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

3.11 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as otherwise indicated.
B. Supply Ducts:
   1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units
      a. Pressure Class: Positive 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12.
   2. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12.
   3. Ducts Connected to Equipment Not Listed Above:
      a. Pressure Class: Positive 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12.

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C. Return Ducts:
   1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
      a. Pressure Class: Positive or negative 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12.
   2. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive or negative 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12
   3. Ducts Connected to Equipment Not Listed Above:
      a. Pressure Class: Positive or negative 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12
D. Exhaust Ducts:
   1. Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
      a. Pressure Class: Negative 2-inch wg.
      b. Minimum SMACNA Seal Class: C.
      c. SMACNA Leakage Class for Rectangular: 24.
      d. SMACNA Leakage Class for Round and Flat Oval: 12
   2. Ducts Connected to Air-Handling Units:
      a. Pressure Class: Positive or negative 2-inch wg.

b. Minimum SMACNA Seal Class: C.
c. SMACNA Leakage Class for Rectangular: 24.
d. SMACNA Leakage Class for Round and Flat Oval: 12

3. Ducts Connected to Equipment Not Listed Above:
a. Pressure Class: Positive or negative 2-inch wg.
b. Minimum SMACNA Seal Class: C.
c. SMACNA Leakage Class for Rectangular: 24.
d. SMACNA Leakage Class for Round and Flat Oval: 12

E. Outdoor-Air (Not Filtered, Heated, or Cooled) Ducts:
1. Ducts Connected to Fan Coil Units, Furnaces, Heat Pumps, and Terminal Units:
a. Pressure Class: Positive or negative 2-inch wg.
b. Minimum SMACNA Seal Class: C.
c. SMACNA Leakage Class for Rectangular: 24.
d. SMACNA Leakage Class for Round and Flat Oval: 12

2. Ducts Connected to Air-Handling Units:
a. Pressure Class: Positive or negative 2-inch wg.
b. Minimum SMACNA Seal Class: C.
c. SMACNA Leakage Class for Rectangular: 24.
d. SMACNA Leakage Class for Round and Flat Oval: 12

3. Ducts Connected to Equipment Not Listed Above:
a. Pressure Class: Positive or negative 2-inch wg.
b. Minimum SMACNA Seal Class: C.
c. SMACNA Leakage Class for Rectangular: 24.
d. SMACNA Leakage Class for Round and Flat Oval: 12

F. Intermediate Reinforcement:
1. Galvanized-Steel Ducts: Galvanized steel.

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G. Liner:
1. Supply and Return Air Ducts and Plenums: Fibrous glass, Type I, 1-1/2 inches thick.
2. Transfer Ducts: Fibrous glass, Type I, 2 inches thick.

H. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
a. Velocity 1000 fpm or Lower:
1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.
b. Velocity 1000 to 1500 fpm:
1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
c. Velocity 1500 fpm or Higher:
1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

2. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."

a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."

3. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
   a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
      1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
      2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
      3) Velocity 1500 fpm or Higher: 1.5 radius-to-diameter ratio and five segments for 90-degree elbow.
      4) Radius-to Diameter Ratio: 1.5.
   b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
   c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.

I. Branch Configuration:
   1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
      a. Rectangular Main to Rectangular Branch: 45-degree entry.
      b. Rectangular Main to Round Branch: Spin in.
   2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
      a. Velocity 1000 fpm or Lower: 90-degree tap.
      b. Velocity 1000 to 1500 fpm: Conical tap.
      c. Velocity 1500 fpm or Higher: 45-degree lateral.

END OF SECTION 233113

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SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Backdraft and pressure relief dampers.
2. Barometric relief dampers.
3. Manual volume dampers.
4. Flange connectors.
5. Turning vanes.
6. Remote damper operators.
7. Duct-mounted access doors.
8. Flexible connectors.
9. Flexible ducts.
10. Duct accessory hardware.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.

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B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
a. Special fittings.
b. Manual volume damper installations.
c. Control-damper installations.
d. Fire-damper, smoke-damper, combination fire- and smoke-damper, ceiling, and corridor damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
e. Duct security bars.
f. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.
B. Source quality-control reports.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 ASSEMBLY DESCRIPTION

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

2.2 MATERIALS

A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   1. Galvanized Coating Designation: G90.
   2. Exposed-Surface Finish: Mill phosphatized.

B. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and finish for exposed ducts.

C. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

D. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 BACKDRAFT AND PRESSURE RELIEF DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Greenheck Fan Corporation.
   2. Pottorff.
   3. Ruskin Company.

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B. Description: Gravity balanced.

C. Maximum Air Velocity: 2500 fpm.

D. Maximum System Pressure: 2-inch wg.

E. Frame: Hat-shaped, 18-gage galvanized sheet steel, with welded corners or mechanically attached and mounting flange.

F. Blades: Multiple single-piece blades, center pivoted, maximum 6-inch width, 0.025-inch- thick, roll-formed aluminum with sealed edges.

G. Blade Action: Parallel.

H. Blade Seals: Extruded vinyl, mechanically locked.

I. Blade Axles:
   1. Material: Plated steel.
   2. Diameter: 0.20 inch.

J. Tie Bars and Brackets: Galvanized steel.

K. Return Spring: Adjustable tension.

L. Bearings: Synthetic pivot bushings.

M. Accessories:
   1. Adjustment device to permit setting for varying differential static pressure.
   2. Counterweights and spring-assist kits for vertical airflow installations.
   3. Chain pulls.
   4. Screen Mounting: Front mounted in sleeve.
      a. Sleeve Thickness: 20 gage minimum.
      b. Sleeve Length: 6 inches minimum.
   5. Screen Mounting: Rear mounted.
   6. Screen Material: Galvanized steel.

7. Screen Type: Bird.
8. 90-degree stops.

2.4 BAROMETRIC RELIEF DAMPERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Greenheck Fan Corporation.
2. Pottorff.
3. Ruskin Company.

B. Suitable for horizontal or vertical mounting.
C. Maximum Air Velocity: 2000 fpm.
D. Maximum System Pressure: 2-inch wg.
E. Frame: Hat-shaped, 16-gage, galvanized sheet steel with welded corners or mechanically attached and mounting flange.
F. Blades:
1. Multiple, 0.025-inch- thick, roll-formed aluminum.
2. Maximum Width: 6 inches.
3. Action: Parallel.
4. Balance: Gravity.
5. Eccentrically pivoted.
G. Blade Seals: Vinyl.
H. Blade Axles: Plated steel.
I. Tie Bars and Brackets:
1. Material: Galvanized steel.
2. Rattle free with 90-degree stop.
J. Return Spring: Adjustable tension.
K. Bearings: Ball.
L. Accessories:
1. Flange on intake.
2. Adjustment device to permit setting for varying differential static pressures.

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2.5 MANUAL VOLUME DAMPERS

A. Standard, Steel, Manual Volume Dampers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Nailor Industries Inc.
b. Pottorff.
c. Ruskin Company.
d. Trox USA Inc.
2. Standard leakage rating.
3. Suitable for horizontal or vertical applications.
4. Frames:
a. Frame: Hat-shaped, 20-gage, galvanized sheet steel.
b. Mitered and welded corners.
c. Flanges for attaching to walls and flangeless frames for installing in ducts.
5. Blades:
a. Multiple or single blade.
b. Parallel- or opposed-blade design.
c. Stiffen damper blades for stability.
d. Galvanized-steel, 0.064 inch thick.

6. Blade Axles: Plated steel.
7. Bearings:
   a. Molded synthetic.
   b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
8. Tie Bars and Brackets: Galvanized steel.

2.6 FLANGE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Ductmate Industries, Inc.
   2. Nexus PDQ; Division of Shilco Holdings Inc.
   3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
B. Description: Roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
C. Material: Galvanized steel.
D. Gage and Shape: Match connecting ductwork.

2.7 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Ductmate Industries, Inc.
   2. Duro Dyne Inc.
   3. METALAIRE, Inc.
   4. SEMCO Incorporated.
B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
   1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
C. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
E. Vane Construction: Double wall.

2.8 REMOTE DAMPER OPERATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Pottorff.
   2. Ventfabrics, Inc.
   3. Young Regulator Company.
B. Description: Cable system designed for remote manual damper adjustment.
C. Tubing: Galvanized spiral wire sheath.
D. Cable: Stainless steel.
E. Wall-Box Mounting: Recessed.
F. Wall-Box Cover-Plate Material: Steel.

2.9 DUCT-MOUNTED ACCESS DOORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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1. Ductmate Industries, Inc.
2. Greenheck Fan Corporation.
3. Pottorff.

B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
   1. Door:
      a. Double wall, rectangular.
      b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
      c. Vision panel.
      d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
      e. Fabricate doors airtight and suitable for duct pressure class.
   2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
   3. Number of Hinges and Locks:
      a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
      b. Access Doors up to 18 Inches Square: Continuous and two sash locks.
      c. Access Doors up to 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.
      d. Access Doors Larger Than 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.

C. Pressure Relief Access Door:
   1. Door and Frame Material: Galvanized sheet steel.
   2. Door: Single wall or double wall with insulation fill with metal thickness applicable for duct pressure class.
   3. Operation: Open outward for positive-pressure ducts and inward for negative-pressure ducts.
   4. Factory set.
   5. Doors close when pressures are within set-point range.
   6. Hinge: Continuous piano.
   7. Latches: Cam.
   8. Seal: Neoprene or foam rubber.
   9. Insulation Fill: 1-inch- thick, fibrous-glass or polystyrene-foam board.

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2.10 DUCT ACCESS PANEL ASSEMBLIES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Ductmate Industries, Inc.
   2. Flame Gard, Inc.
   3. 3M.

B. Labeled according to UL 1978 by an NRTL.

C. Panel and Frame: Minimum thickness 11-gage carbon steel.

D. Fasteners: Carbon steel. Panel fasteners shall not penetrate duct wall.

E. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.

F. Minimum Pressure Rating: 10-inch wg, positive or negative.

2.11 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Ductmate Industries, Inc.

2. Duro Dyne Inc.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.

E. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd..
2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
3. Service Temperature: Minus 40 to plus 200 deg F.

F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
1. Minimum Weight: 24 oz./sq. yd..
2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
3. Service Temperature: Minus 50 to plus 250 deg F.

G. High-Temperature System, Flexible Connectors: Glass fabric coated with silicone rubber.
1. Minimum Weight: 16 oz./sq. yd..
2. Tensile Strength: 285 lbf/inch in the warp and 185 lbf/inch in the filling.
3. Service Temperature: Minus 67 to plus 500 deg F.

H. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.
1. Minimum Weight: 14 oz./sq. yd..
2. Tensile Strength: 450 lbf/inch in the warp and 340 lbf/inch in the filling.
3. Service Temperature: Minus 67 to plus 500 deg F.

I. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.
1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

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2.12 FLEXIBLE DUCTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Flexmaster U.S.A., Inc.
2. McGill AirFlow LLC.
3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Insulated, Flexible Duct: UL 181, Class 1, polyethylene film supported by helically wound, galvanized-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.
1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
2. Maximum Air Velocity: 5500 fpm.
3. Temperature Range: Minus 10 to plus 160 deg F.

4. Insulation R-value: Comply with ASHRAE/IESNA 90.1.

C. Flexible Duct Connectors:
1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action in sizes 3 through 18 inches, to suit duct size.
2. Non-Clamp Connectors: Adhesive plus sheet metal screws.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.

B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.

C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
1. Install steel volume dampers in steel ducts.
2. Install aluminum volume dampers in aluminum ducts.

E. Set dampers to fully open position before testing, adjusting, and balancing.

F. Install test holes at fan inlets and outlets and elsewhere as indicated.

G. Install fire and smoke dampers according to UL listing.

H. Connect ducts to duct silencers rigidly.

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I. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
1. On both sides of duct coils.
2. Upstream from duct filters.
3. At outdoor-air intakes and mixed-air plenums.
4. At drain pans and seals.
5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
7. At each change in direction and at maximum 50-foot spacing.
8. Upstream from turning vanes.
9. Upstream or downstream from duct silencers.
10. Control devices requiring inspection.
11. Elsewhere as indicated.

J. Install access doors with swing against duct static pressure.

K. Access Door Sizes:
1. One-Hand or Inspection Access: 8 by 5 inches.
2. Two-Hand Access: 12 by 6 inches.
3. Head and Hand Access: 18 by 10 inches.
4. Head and Shoulders Access: 21 by 14 inches.
5. Body Access: 25 by 14 inches.
6. Body plus Ladder Access: 25 by 17 inches.

L. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
M. Install flexible connectors to connect ducts to equipment.
N. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
O. Connect diffusers to ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.
P. Connect flexible ducts to metal ducts with draw bands.
Q. Install duct test holes where required for testing and balancing purposes.
R. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. Operate dampers to verify full range of movement.
   2. Inspect locations of access doors and verify that purpose of access door can be performed.
   3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
   4. Inspect turning vanes for proper and secure installation.
   5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION 233300

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SECTION 23 34 23 - HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Centrifugal roof ventilators.
   2. Ceiling-mounted ventilators.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on actual project site elevations.
B. Operating Limits: Classify according to AMCA 99.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Also include the following:
   1. Certified fan performance curves with system operating conditions indicated.
   2. Certified fan sound-power ratings.
   3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
   4. Material thickness and finishes, including color charts.
   5. Dampers, including housings, linkages, and operators.
   6. Roof curbs.
   7. Fan speed controllers.

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B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
   1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   2. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
   1. Roof framing and support members relative to duct penetrations.
   2. Ceiling suspension assembly members.
   3. Size and location of initial access modules for acoustical tile.
   4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
B. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For power ventilators to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Belts: One set for each belt-driven unit.

1.8 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.
C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

1.9 COORDINATION

A. Coordinate size and location of structural-steel support members.
B. Coordinate sizes and locations of concrete bases with actual equipment provided.
C. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

PART 2 - PRODUCTS

2.1 CENTRIFUGAL ROOF VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. Aerovent; a division of Twin City Fan Companies, Ltd.

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B. Housing: Removable, spun-aluminum dome top and outlet baffle; square, one-piece, aluminum base with venturi inlet cone.
1. Doanblast Units: Provide spun-aluminum discharge baffle to direct discharge air downward.
C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.
D. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted outside fan housing, factory wired through an internal aluminum conduit.
3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.
E. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Built-in cant and mounting flange.
2. Overall Height: As required to maintain 12” above finish roof.
3. Sound Curb: Curb with sound-absorbing insulation.
4. Pitch Mounting: Manufacture curb for roof slope.
5. Metal Liner: Galvanized steel.

2.2 CEILING-MOUNTED VENTILATORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. Aerovent; a division of Twin City Fan Companies, Ltd.

B. Housing: Steel, lined with acoustical insulation.

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor, and fan wheel shall be removable for service.

D. Grille: Plastic or painted aluminum, louvered grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Manual Starter Switch: Single-pole rocker switch assembly with cover and pilot light.
3. Time-Delay Switch: Assembly with single-pole rocker switch, timer, and cover plate.
4. Motion Sensor: Motion detector with adjustable shutoff timer.
5. Ceiling Radiation Damper: Fire-rated assembly with ceramic blanket, stainless-steel springs, and fusible link.
6. Filter: Washable aluminum to fit between fan and grille.
7. Isolation: Rubber-in-shear vibration isolators.
8. Manufacturer's standard roof jack or wall cap, and transition fittings.

2.3 IN-LINE CENTRIFUGAL FANS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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1. Greenheck Fan Corporation.
2. Loren Cook Company.
3. Aerovent; a division of Twin City Fan Companies, Ltd.

B. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.

C. Direct-Drive Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing; with wheel, inlet cone, and motor on swing-out service door.

D. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.

E. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.

F. Accessories:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
2. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
3. Companion Flanges: For inlet and outlet duct connections.
4. Fan Guards: 1/2- by 1-inch mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
5. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.
6. Vibration Isolators:
   a. Type: Spring hangers.
   b. Static Deflection: 1 inch.

2.4 MOTORS

A. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.

B. Enclosure Type: Totally enclosed, fan cooled.

2.5 SOURCE QUALITY CONTROL

A. Certify sound-power level ratings according to AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.

B. Certify fan performance ratings, including flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests according to AMCA 210, "Laboratory Methods of Testing Fans for Aerodynamic Performance Rating." Label fans with the AMCA-Certified Ratings Seal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Secure roof-mounted fans to roof curbs with cadmium-plated hardware. See Section 077200 "Roof Accessories" for installation of roof curbs.

C. Ceiling Units: Suspend units from structure; use steel wire or metal straps.

D. Support suspended units from structure using threaded steel rods and spring hangers having a static deflection of 1 inch. Vibration-control devices are specified in Section 230548 "Vibration and Seismic Controls for HVAC."

E. Install units with clearances for service and maintenance.

F. Label units according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

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3.2 CONNECTIONS

A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."

B. Install ducts adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

B. Tests and Inspections:

1. Verify that shipping, blocking, and bracing are removed.
2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.
3. Verify that cleaning and adjusting are complete.

4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
5. Adjust belt tension.
6. Adjust damper linkages for proper damper operation.
7. Verify lubrication for bearings and other moving parts.
8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
10. Shut unit down and reconnect automatic temperature-control operators.
11. Remove and replace malfunctioning units and retest as specified above.

C. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
D. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.
B. Adjust belt tension.
C. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.
D. Replace fan and motor pulleys as required to achieve design airflow.
E. Lubricate bearings.

END OF SECTION 233423

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SECTION 23 37 13 - AIR DIFFUSERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Modular core, square ceiling diffusers.
   2. Perforated diffusers.
   3. Linear slot diffusers.

B. Related Sections:
   1. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated, include the following:
   1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
   2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
   1. Ceiling suspension assembly members.
   2. Method of attaching hangers to building structure.
   3. Size and location of initial access modules for acoustical tile.
   4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
   5. Duct access panels.

B. Source quality-control reports.

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PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS

A. Modular Core, Square Ceiling Diffuser:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Price Industries.
      b. Titus.
      c. Anemostat Products; a Mestek company.
   2. Devices shall be specifically designed for variable-air-volume flows.
   3. Material: Steel.
   4. Finish: Baked enamel, color selected by Architect.
   5. Face Style: Modular Core.
   6. Mounting: Surface.
   7. Pattern: Adjustable.

B. Perforated Diffuser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Price Industries.
   b. Titus.
   c. Anemostat Products; a Mestek company.
2. Devices shall be specifically designed for variable-air-volume flows.
3. Material: Steel.
4. Finish: Baked enamel, color selected by Architect.
5. Duct Inlet: Square.
6. Face Style: Flush.
7. Mounting: T-bar.
8. Pattern Controller: Adjustable with louvered pattern modules at inlet.

2.2 CEILING LINEAR SLOT OUTLETS

A. Linear Slot Diffuser:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Price Industries.
      b. Titus.
      c. Anemostat Products; a Mestek company.
   2. Devices shall be specifically designed for variable-air-volume flows.
   3. Material - Shell: Aluminum.
   4. Material - Pattern Controller: Steel.
   5. Finish: Baked enamel, color selected by Architect.
   6. Slot Width: As indicated on plans.
   7. Number of Slots: As indicated on plans.
   8. Length: As indicated on plans.

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2.3 SOURCE QUALITY CONTROL

A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb.
B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

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SECTION 23 74 13 - PACKAGED, OUTDOOR, CENTRAL-STATION AIR-HANDLING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes packaged, outdoor, central-station air-handling units (rooftop units) with the following components and accessories:
   1. Direct-expansion cooling.
   2. Heat-pump refrigeration components.
   3. Economizer outdoor- and return-air damper section.
   4. Integral, space temperature controls.
   5. Roof curbs.

1.3 DEFINITIONS

A. DDC: Direct-digital controls.
B. ECM: Electrically commutated motor.
C. Outdoor-Air Refrigerant Coil: Refrigerant coil in the outdoor-air stream to reject heat during cooling operations and to absorb heat during heating operations. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.
D. Outdoor-Air Refrigerant-Coil Fan: The outdoor-air refrigerant-coil fan in RTUs. "Outdoor air" is defined as the air outside the building or taken from outdoors and not previously circulated through the system.
E. RTU: Rooftop unit. As used in this Section, this abbreviation means packaged, outdoor, central-station air-handling units. This abbreviation is used regardless of whether the unit is mounted on the roof or on a concrete base on ground.
F. Supply-Air Fan: The fan providing supply air to conditioned space. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.
G. Supply-Air Refrigerant Coil: Refrigerant coil in the supply-air stream to absorb heat (provide cooling) during cooling operations and to reject heat (provide heating) during heating operations. "Supply air" is defined as the air entering a space from air-conditioning, heating, or ventilating apparatus.

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1.4 ACTION SUBMITTALS

A. Product Data: Include manufacturer's technical data for each RTU, including rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
   1. Wiring Diagrams: Power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Structural members to which RTUs will be attached.
   2. Roof openings
   3. Roof curbs and flashing.

B. Manufacturer Wind Loading Qualification Certification: Submit certification that specified equipment will withstand wind forces identified in "Performance Requirements" Article and in Section 230548 "Vibration and Seismic Controls for HVAC."
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculations.
   2. Dimensioned Outline Drawings of Equipment Unit: Identify center of wind force and locate and describe mounting and anchorage provisions.
   3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

C. Manufacturer Seismic Qualification Certification: Submit certification that RTUs, accessories, and components will withstand seismic forces defined in "Performance Requirements" Article and in Section 230548 "Vibration and Seismic Controls for HVAC."
   1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
   3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Field quality-control test reports.

E. Warranty: Special warranty specified in this Section.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.

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1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Fan Belts: One set for each belt-driven fan.
   2. Filters: One set of filters for each unit.

1.8 QUALITY ASSURANCE

A. ARI Compliance:
   1. Comply with ARI 203/110 and ARI 303/110 for testing and rating energy efficiencies for RTUs.
   2. Comply with ARI 270 for testing and rating sound performance for RTUs.

B. ASHRAE Compliance:
   1. Comply with ASHRAE 15 for refrigeration system safety.
   2. Comply with ASHRAE 33 for methods of testing cooling and heating coils.
   3. Comply with applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."

C. ASHRAE/IESNA 90.1 Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."

D. NFPA Compliance: Comply with NFPA 90A and NFPA 90B.

E. UL Compliance: Comply with UL 1995.

F. Electrical Components, Devices, and Accessories: Listed and labeled as defined in CEC, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to replace components of RTUs that fail in materials or workmanship within specified warranty period.
   1. Warranty Period for Compressors: Manufacturer's standard, but not less than five years from date of Substantial Completion.
   2. Warranty Period for Gas Furnace Heat Exchangers: Manufacturer's standard, but not less than five years from date of Substantial Completion.
   3. Warranty Period for Solid-State Ignition Modules: Manufacturer's standard, but not less than three years from date of Substantial Completion.
   4. Warranty Period for Control Boards: Manufacturer's standard, but not less than three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Carrier Corporation.
   2. Trane; American Standard Companies, Inc.
   3. YORK International Corporation.

2.2 CASING

A. General Fabrication Requirements for Casings: Formed and reinforced double-wall insulated panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.
B. Exterior Casing Material: Galvanized steel with factory-painted finish, with pitched roof panels and knockouts with grommet seals for electrical and piping connections and lifting lugs.
   1. Exterior Casing Thickness: 0.052 inch thick.
C. Inner Casing Fabrication Requirements:
   1. Inside Casing: Galvanized steel, 0.034 inch thick.
D. Casing Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.
   1. Materials: ASTM C 1071, Type I.
   2. Thickness: 1/2 inch
   3. Liner materials shall have air-stream surface coated with an erosion- and temperature-resistant coating or faced with a plain or coated fibrous mat or fabric.
   4. Liner Adhesive: Comply with ASTM C 916, Type I.
E. Condensate Drain Pans: Formed sections of galvanized steel sheet, a minimum of 2 inches deep, and complying with ASHRAE 62.1.
   1. Double-Wall Construction: Fill space between walls with foam insulation and seal moisture tight.
   2. Drain Connections: Threaded nipple.
   3. Pan-Top Surface Coating: Corrosion-resistant compound.
F. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

2.3 FANS

A. Direct-Driven Supply-Air Fans: Double width, forward curved, centrifugal; with permanently lubricated, ECM motor resiliently mounted in the fan inlet. Aluminum or painted-steel wheels, and galvanized- or painted-steel fan scrolls.

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B. Belt-Driven Supply-Air Fans: Double width, forward curved, centrifugal; with permanently lubricated, single-speed motor installed on an adjustable fan base resiliently mounted in the casing. Aluminum or painted-steel wheels, and galvanized- or painted-steel fan scrolls.
C. Condenser-Coil Fan: Propeller, mounted on shaft of permanently lubricated motor.
D. Seismic Fabrication Requirements: Fabricate fan section, internal mounting frame and attachment to fans, fan housings, motors, casings, accessories, and other fan section components with reinforcement strong enough to withstand seismic forces defined in Section 230548 "Vibration and Seismic Controls for HVAC" when fan-mounted frame and RTU-mounted frame are anchored to building structure.

2.4 COILS

A. Supply-Air Refrigerant Coil:
1. Aluminum-plate fin and seamless internally grooved copper tube in steel casing with equalizing-type vertical distributor.
2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.
3. Coil Split: Interlaced.
4. Condensate Drain Pan: Galvanized steel with corrosion-resistant coating formed with pitch and drain connections complying with ASHRAE 62.1.

B. Hot-Gas Reheat Refrigerant Coil:
1. Aluminum-plate fin and seamless internally grooved copper tube in steel casing with equalizing-type vertical distributor.
2. Polymer strip shall prevent all copper coil from contacting steel coil frame or condensate pan.

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2.5 REFRIGERANT CIRCUIT COMPONENTS

A. Compressor: Hermetic, scroll, mounted on vibration isolators; with internal overcurrent and high-temperature protection, internal pressure relief.
B. Refrigeration Specialties:
1. Refrigerant: R-454B.
2. Expansion valve with replaceable thermostatic element.
3. Refrigerant filter/dryer.
4. Manual-reset high-pressure safety switch.
5. Automatic-reset low-pressure safety switch.
6. Minimum off-time relay.
7. Automatic-reset compressor motor thermal overload.
8. Brass service valves installed in compressor suction and liquid lines.
9. Low-ambient kit high-pressure sensor.
10. Hot-gas reheat solenoid valve with a replaceable magnetic coil.
11. Hot-gas bypass solenoid valve with a replaceable magnetic coil.
12. Four-way reversing valve with a replaceable magnetic coil, thermostatic expansion valves with bypass check valves, and a suction line accumulator.

2.6 AIR FILTRATION

A. Minimum arrestance according to ASHRAE 52.1, and a minimum efficiency reporting value (MERV) according to ASHRAE 52.2.
1. Pleated: Minimum 90 percent arrestance, and MERV 13.

2.7 DAMPERS

A. Outdoor- and Return-Air Mixing Dampers: Parallel- or opposed-blade galvanized-steel dampers mechanically fastened to cadmium plated for galvanized-steel operating rod in

reinforced cabinet. Connect operating rods with common linkage and interconnect linkages so dampers operate simultaneously.

1. Damper Motor: Modulating with adjustable minimum position.
2. Relief-Air Damper: Gravity actuated or motorized, as required by ASHRAE/IESNA 90.1, with bird screen and hood.

2.8 ELECTRICAL POWER CONNECTION

A. Provide for single connection of power to unit with unit-mounted disconnect switch accessible from outside unit and control-circuit transformer with built-in overcurrent protection.

2.9 CONTROLS

A. Control equipment and sequence of operation are specified in Section 230900 "Instrumentation and Control for HVAC."

B. Basic Unit Controls:
   1. Control-voltage transformer.
   2. Wall-mounted thermostat or sensor with the following features:
      a. Heat-cool-off switch.
      b. Fan on-auto switch.
      c. Fan-speed switch.
      d. Automatic changeover.
      e. Adjustable deadband.
      f. Exposed set point.
      g. Exposed indication.
      h. Degree F indication.
      i. Data entry and access port to input temperature set points, occupied and unoccupied periods, and output room temperature, supply-air temperature, operating mode, and status.
   3. Remote Wall-Mounted Annunciator Panel for Each Unit:
      a. Lights to indicate power on, cooling, heating, fan running, filter dirty, and unit alarm or failure.
      b. DDC controller or programmable timer and interface with HVAC instrumentation and control system.
      c. Digital display of outdoor-air temperature, supply-air temperature, return-air temperature, economizer damper position, indoor-air quality, and control parameters.

C. DDC Controller:
   1. Controller shall have volatile-memory backup.
   2. Safety Control Operation:
      a. Smoke Detectors: Stop fan and close outdoor-air damper if smoke is detected. Provide additional contacts for alarm interface to fire alarm control panel.
      b. Fire Alarm Control Panel Interface: Provide control interface to coordinate with operating sequence described in Section 283111 "Digital, Addressable Fire-Alarm System" and Section 283112 "Zoned (DC Loop) Fire-Alarm System."
      c. Low-Discharge Temperature: Stop fan and close outdoor-air damper if supply air temperature is less than 40 deg F.
   3. Scheduled Operation: Occupied and unoccupied periods on 365-day clock with a minimum of four programmable periods per day.
   4. Unoccupied Period:
      a. Heating Setback: 50 deg F.
      b. Cooling Setback: System off.
      c. Override Operation: Two hours.

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5. Supply Fan Operation:
   a. Occupied Periods: Run fan continuously.
   b. Unoccupied Periods: Cycle fan to maintain setback temperature.
6. Refrigerant Circuit Operation:
   a. Occupied Periods: Cycle or stage compressors, and operate hot-gas bypass to match compressor output to cooling load to maintain room temperature. Cycle condenser fans to maintain maximum hot-gas pressure. Operate low-ambient control kit to maintain minimum hot-gas pressure.
   b. Unoccupied Periods: Cycle compressors and condenser fans for heating to maintain setback temperature.
   c. Switch reversing valve for heating or cooling mode on air-to-air heat pump.
7. Hot-Gas Reheat-Coil Operation:
   a. Occupied Periods: Humidistat opens hot-gas valve to provide hot-gas reheat, and cycles compressor.
   b. Unoccupied Periods: Reheat not required.
8. Gas Furnace Operation:
   a. Occupied Periods: Modulate burner to maintain room temperature.
   b. Unoccupied Periods: Cycle burner to maintain setback temperature.
9. Economizer Outdoor-Air Damper Operation:
   a. Occupied Periods: Open to minimum position as determined during air balancing procedure to obtain code required minimum outside air quantities. Controller shall permit air-side economizer operation when outdoor air is less than 60 deg F. Use outdoor-air temperature to adjust mixing dampers. Start relief-air fan with end switch on outdoor-air damper. During economizer cycle operation, lock out cooling.
   b. Unoccupied Periods: Close outdoor-air damper and open return-air damper.
10. Carbon Dioxide Sensor Operation:
    a. Occupied Periods: Reset minimum outdoor-air ratio down to minimum 10 percent to maintain maximum 1000-ppm concentration.
    b. Unoccupied Periods: Close outdoor-air damper and open return-air damper.
11. VVT Relays:
    a. Provide heating- and cooling-mode changeover relays compatible with VVT terminal control system required in Section 233600 "Air Terminal Units" and Section 230900 "Instrumentation and Control for HVAC."

D. Interface Requirements for HVAC Instrumentation and Control System:
1. Interface relay for scheduled operation.
2. Interface relay to provide indication of fault at the central workstation and diagnostic code storage.
3. Provide BACnet or LonWorks compatible interface for central HVAC control workstation for the following:
   a. Adjusting set points.
   b. Monitoring supply fan start, stop, and operation.
   c. Inquiring data to include outdoor-air damper position, supply- and room-air temperature.
   d. Monitoring occupied and unoccupied operations.
   e. Monitoring constant and variable motor loads.
   f. Monitoring variable-frequency drive operation.
   g. Monitoring cooling load.
   h. Monitoring economizer cycles.
   i. Monitoring air-distribution static pressure and ventilation air volume.

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2.10 ACCESSORIES

A. Duplex, 115-V, ground-fault-interrupter outlet with 15-A overcurrent protection. Include transformer if required.

B. Filter differential pressure switch with sensor tubing on either side of filter. Set for final filter pressure loss.

C. Coil guards of painted, galvanized-steel wire.

2.11 ROOF CURBS

A. Roof curbs with vibration isolators and wind or seismic restraints are specified in Section 230548 "Vibration and Seismic Controls for HVAC."

B. Materials: Galvanized steel with corrosion-protection coating, watertight gaskets, and factory-installed wood nailer; complying with NRCA standards.

1. Curb Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.
   a. Materials: ASTM C 1071, Type I or II.
   b. Thickness: 1 inch.
2. Application: Factory applied with adhesive and mechanical fasteners to the internal surface of curb.
   a. Liner Adhesive: Comply with ASTM C 916, Type I.
   b. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in cabinet.
   c. Liner materials applied in this location shall have air-stream surface coated with a temperature-resistant coating or faced with a plain or coated fibrous mat or fabric depending on service air velocity.
   d. Liner Adhesive: Comply with ASTM C 916, Type I.

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C. Curb Height: 14 inches.

D. Wind and Seismic Restraints: Metal brackets compatible with the curb and casing, painted to match RTU, used to anchor unit to the curb, and designed for loads at Project site. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC" for wind-load requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.

B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.

C. Examine roofs for suitable conditions where RTUs will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Equipment Mounting:

1. Install RTUs on cast-in-place concrete equipment bases.
2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

B. Roof Curb: Install on roof structure or concrete base, level and secure, according to NRCA's "Low-Slope Membrane Roofing Construction Details Manual," Illustration "Raised Curb Detail for Rooftop Air Handling Units and Ducts." Install RTUs on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 077200 "Roof

Accessories." Secure RTUs to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts.

C. Unit Support: Install unit level on structural curbs. Coordinate wall penetrations and flashing with wall construction. Secure RTUs to structural support with anchor bolts.

3.3 CONNECTIONS

A. Install condensate drain, minimum connection size, with trap and indirect connection to nearest roof drain or area drain.

B. Install piping adjacent to RTUs to allow service and maintenance.
   1. Gas Piping: Connect gas piping to burner, full size of gas train inlet, and connect with union and shutoff valve with sufficient clearance for burner removal and service.

C. Duct installation requirements are specified in other HVAC Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
   1. Install ducts to termination at top of roof curb.
   2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
   3. Connect supply ducts to RTUs with flexible duct connectors specified in Section 233300 "Air Duct Accessories."
   4. Install return-air duct continuously through roof structure.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

B. Perform tests and inspections and prepare test reports.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing. Report results in writing.

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C. Tests and Inspections:
   1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
   2. Inspect for and remove shipping bolts, blocks, and tie-down straps.
   3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Remove and replace malfunctioning units and retest as specified above.

3.5 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

B. Complete installation and startup checks according to manufacturer's written instructions and do the following:
   1. Inspect for visible damage to unit casing.
   2. Inspect for visible damage to compressor, coils, and fans.
   3. Inspect internal insulation.
   4. Verify that labels are clearly visible.
   5. Verify that clearances have been provided for servicing.
   6. Verify that controls are connected and operable.
   7. Verify that filters are installed.
   8. Clean condenser coil and inspect for construction debris.
   9. Remove packing from vibration isolators.

10. Inspect operation of barometric relief dampers.
11. Verify lubrication on fan and motor bearings.
12. Inspect fan-wheel rotation for movement in correct direction without vibration and binding.
13. Adjust fan belts to proper alignment and tension.
14. Start unit according to manufacturer's written instructions.
    a. Start refrigeration system.
    b. Do not operate below recommended low-ambient temperature.
    c. Complete startup sheets and attach copy with Contractor's startup report.
15. Inspect and record performance of interlocks and protective devices; verify sequences.
16. Operate unit for an initial period as recommended or required by manufacturer.
17. Calibrate thermostats.
18. Adjust and inspect high-temperature limits.
19. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
20. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:
    a. Coil leaving-air, dry- and wet-bulb temperatures.
    b. Coil entering-air, dry- and wet-bulb temperatures.
    c. Outdoor-air, dry-bulb temperature.
    d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
21. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
22. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.
    a. Supply-air volume.
    b. Return-air volume.
    c. Relief-air volume.
    d. Outdoor-air intake volume.
23. Simulate maximum cooling demand and inspect the following:
    a. Compressor refrigerant suction and hot-gas pressures.
    b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.
24. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:
    a. High-temperature limit on gas-fired heat exchanger.
    b. Low-temperature safety operation.
    c. Filter high-pressure differential alarm.
    d. Economizer to minimum outdoor-air changeover.
    e. Relief-air fan operation.
    f. Smoke and firestat alarms.
25. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

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3.6 CLEANING AND ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to site during other-than-normal occupancy hours for this purpose.

B. After completing system installation and testing, adjusting, and balancing RTU and air-distribution systems, clean filter housings and install new filters.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain RTUs. Refer to Section 017900 "Demonstration and Training."

END OF SECTION 237413

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SECTION 23 81 26 - SPLIT-SYSTEM AIR-CONDITIONERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes split-system air-conditioning and heat-pump units consisting of separate evaporator-fan and compressor-condenser components.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Wiring Diagrams: For power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Warranty: Sample of special warranty.

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1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Filters: One set for each air-handling unit.
2. Gaskets: One set for each access door.
3. Fan Belts: One set for each air-handling unit fan.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. ASHRAE Compliance:

1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - " Procedures," and Section 7 - "Construction and System Start-up."

C. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.

1.8 COORDINATION

A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."

B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

1.9 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.

1. Warranty Period:
   a. For Compressor: Five year(s) from date of Substantial Completion.
   b. For Parts: One year from date of Substantial Completion.
   c. For Labor: One year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Carrier Corporation; Home Comfort and HVAC Building & Industrial Systems.
2. Mitsubishi Electric & Electronics USA, Inc.; HVAC Advanced Products Division.
3. Trane; a business of American Standard companies.
4. YORK; a Johnson Controls company.

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2.2 INDOOR UNITS (5 TONS OR LESS)

A. Concealed Evaporator-Fan Components:

1. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
2. Insulation: Faced, glass-fiber duct liner.
3. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
4. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.
5. Fan Motors:
   a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
   b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
   c. Wiring Terminations: Connect motor to chassis wiring with plug connection.
6. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
7. Filters: Permanent, cleanable.
8. Condensate Drain Pans:
   a. Fabricated with one percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
      1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.

2) Depth: A minimum of 2 inches deep.
b. Single-wall, galvanized-steel sheet.
c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
1) Minimum Connection Size: NPS 1.
d. Pan-Top Surface Coating: Asphaltic waterproofing compound.
e. Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil.

B. Wall-Mounted, Evaporator-Fan Components:
1. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
2. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and thermal-expansion valve. Comply with ARI 206/110.
3. Fan: Direct drive, centrifugal.
4. Fan Motors:
a. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
b. Multitapped, multispeed with internal thermal protection and permanent lubrication.
c. Enclosure Type: Totally enclosed, fan cooled.
d. NEMA Premium (TM) efficient motors as defined in NEMA MG 1.
e. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.
f. Mount unit-mounted disconnect switches on exterior of unit.
5. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.
6. Filters: Permanent, cleanable.
7. Condensate Drain Pans:
a. Fabricated with **one** percent slope in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and humidifiers, and to direct water toward drain connection.
1) Length: Extend drain pan downstream from leaving face to comply with ASHRAE 62.1.
2) Depth: A minimum of 1 inch deep.
b. Single-wall, galvanized-steel sheet.
c. Drain Connection: Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
1) Minimum Connection Size: NPS 1.
d. Pan-Top Surface Coating: Asphaltic waterproofing compound.

2.3 OUTDOOR UNITS (5 TONS OR LESS)

A. Air-Cooled, Compressor-Condenser Components:
1. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
2. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
a. Compressor Type: Scroll.

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b. Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
c. Refrigerant Charge: R-454B
d. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.

3. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
4. Fan: Aluminum-propeller type, directly connected to motor.
5. Motor: Permanently lubricated, with integral thermal-overload protection.
6. Low Ambient Kit: Permits operation down to 45 deg F.
7. Mounting Base: Polyethylene.

2.4 ACCESSORIES

A. Control equipment and sequence of operation are specified in Section 230900 "Instrumentation and Control for HVAC" and Section 230993 "Sequence and Operations for HVAC Controls."
B. Thermostat: Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:
1. Compressor time delay.
2. 24-hour time control of system stop and start.
3. Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
4. Fan-speed selection including auto setting.
C. Automatic-reset timer to prevent rapid cycling of compressor.
D. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
E. Drain Hose: For condensate.

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PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.
B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
C. Install roof-mounted, compressor-condenser components on equipment supports specified in Section 077200 "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
D. Equipment Mounting:
1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in other sections.
2. Install ground-mounted, compressor-condenser components on polyethylene mounting base.
3. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
4. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."
E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
C. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
B. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
C. Tests and Inspections:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
D. Remove and replace malfunctioning units and retest as specified above.
E. Prepare test and inspection reports.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.

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3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 238126

ELECTRICAL DIVISIONS – 26, 27, 28 – TABLE OF CONTENTS

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SECTION 26 05 00 – ELECTRICAL GENERAL PROVISIONS

PART 1 GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to, the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. Electrical General Provisions and Requirements for electrical work.
   3. Division-1; General Requirements; General Conditions.

B. Organization of the Specifications into Divisions, Sections and Articles, and Arrangement of Drawings shall not control the Contractor in dividing the Contract Work among Subcontractors or in establishing the extent of work to be performed by any trade.

1.2 GENERAL SUMMARY OF ELECTRICAL WORK

A. The Specifications and Drawings are intended to cover a complete installation of systems. The omission of expressed reference to any item of labor or material for the proper execution of the work in accordance with present practice of the trade shall not relieve the Contractor from providing such additional labor and materials.

B. Refer to the Drawings and Shop Drawings of other trades for additional details, which affect the proper installation of this work. Diagrams and symbols showing electrical connections are diagrammatic only. Wiring diagrams do not necessarily show the exact physical arrangement of the equipment.

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C. Before submitting a bid, the Contractor shall become familiar with all features of the Building Drawings and Site Drawings, which may affect the execution of the work. No extra payment will be allowed for failure to obtain this information.

D. If there are Omissions or Conflicts between the Drawings and Specifications, clarify these points with the Owner's Representative before submitting bid and before commencing work.

E. Provide Work and Material in Conformance with the Manufacturer's published recommendations for respective equipment and systems.

1.3 LOCATIONS OF EQUIPMENT

A. The Drawings indicate diagrammatically the desired locations or arrangements of conduit runs, outlets, equipment, etc., and are to be followed as closely as possible. Proper judgment must be exercised in executing the work to secure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structure conditions encountered.

B. Where Outlets are placed on a Wall, locate symmetrically with respect to each other, furniture, cabinets, and other features or finishes on the wall.

C. In the event Changes in the indicated locations or arrangements are necessary, due to developed conditions in the building construction or rearrangement of furnishings or equipment, such changes shall be made without cost to the Contract, providing the change is ordered before the conduit runs, etc., and work directly connected to same is installed and no extra materials are required.

D. Lighting Fixtures in Mechanical Spaces are shown in their approximate location only. Do not install light outlets or fixtures until mechanical piping and ductwork is installed; then install lights in a location to provide best lighting.
E. Coordinate and cooperate in every way with other trades to avoid interference and assure a satisfactory job.
F. The Location of the Existing Utilities, Building, Equipment and Conduit shown on the Drawings is approximate.
G. The Locations of Existing Underground Utilities, where shown on Drawings, are shown diagrammatically and have not been independently verified by the Owner, the Owner's Representative, the Architect/Engineer. The Owner, the Owner's Representative, and the Owner's Architect/Engineer are not responsible for the location of underground utilities or structures, whether or not shown or detailed and installed under this or any other Contracts. The Contractor shall identify each existing utility line prior to excavation and mark the locations on the ground of each existing utility line.

1.4 AIR CONDITIONING, HEATING, PLUMBING EQUIPMENT WIRING

Provide Electrical Work, Materials, and Control Components required for proper operation of the air conditioning, heating and plumbing systems as indicated on the Electrical, Mechanical, and Plumbing Contract Documents and specified herein.

1.5 POWER, TELEPHONE AND OTHER SIGNAL SERVICES

A. Southern California Edison Co. (SCE) electric service and metering facilities shall conform to the requirements of SCE. Contractor shall verify service locations and Requirements, and information relative to this project directly from SCE.
B. Location of transformer pad and or manholes and pull boxes and routing of service conduits indicated on the Drawings are approximate and shall be verified with the Edison Co. prior to installation. Installation of service shall not begin until approved Drawings have been received from the SCE.

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1.6 PERMITS

Arrange for and schedule all required inspections and examinations without additional cost to the Owner.

1.7 QUALITY ASSURANCE

A. All materials shall be manufactured in the United States unless the material is not manufactured in the United States.
B. Work and Materials shall be in full accordance with the latest Rules and Regulations. The publications shall be included in the Contract Documents Requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the Requirements describing the more restrictive provisions shall become the applicable Contract definition:
    1. California Code of Regulations Title 24.
    2. California Part 3 "California Electrical Code" CEC, Title 24 and Title 8 "Division of Industrial Safety".
    3. California Building Code – CBC.
    4. California Fire Code – CFC
    5. The National Electrical Code – NEC/NFPA 70.
    6. The Life Safety Code – NFPA 101.
    7. The Uniform Building Code – UBC.
    8. International Building Code – IBC.
    9. National Fire Protection Agency – NFPA.

10. National Fire Alarm Code – NFAC/NFPA 72.
11. Underwriter's Laboratory – UL.
12. Other applicable State and Local Government Agencies Laws and Regulations.
13. Electrical Installation Standards National Electrical Contractors Association (NECA) and National Electrical Installation Standards (NEIS):
    a. NECA/NEIS-1: Standard of Practices for Good Workmanship in Electrical Contracting
    b. NECA/NEIS-101: Standard for Installing Steel Conduit (Rigid, IMC, etc.)
    c. NECA/NEIS-104: Recommended Practice for Installing Aluminum Building Wire and Cable
    d. NECA/NEIS-105: Recommended Practice Installing Metal Cable Trays
    e. NECA/NEIS-111: Recommended Practice Installing Nonmetallic Raceways
    f. NECA/NEIS-230: Recommended Practice for Installing Motors
    g. NECA/FOA-301: Standards for Installing and Testing Fiber Optic Cables
    h. NECA/NEIS-305: Standard for Fire Alarm System Job Practice
    i. NECA/NEIS–331: Standards for Installing Building and Service Entrance Grounding
    j. NECA/NEIS-400: Recommended Practice for Installing and Maintaining Switch-boards
    k. NECA/NEIS-402: Recommended Practice for Installing and Maintaining Motor Control Centers
    l. NECA/NEIS-407: Recommended Practice for Installing Panel-boards
    m. NECA/NEIS-408: Recommended Practices for Installing Busway
    n. NECA/NEIS-409: Recommended Practice for Installing and Maintaining Dry-Type Transformers
    o. NEIS/NECA and IESNA-500: Recommended Practice for installing Indoor Commercial Lighting Systems
    p. NEIS/NECA and IESNA-501: Recommended Practice for installing Exterior Lighting Systems
    q. NEIS and IESNA-502: Recommended Practice for Installing Industrial Lighting Systems
    r. NECA/BICSI-568: Standards for Installing Commercial Building Telecommunications System

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C. All Material and Equipment shall be new and shall be delivered to the site in unbroken packages. All material and equipment shall be listed and labeled by Underwriters Laboratories or other recognized Testing Laboratories, where such listings are available. Comply with all installation Requirements and restrictions pertaining to such listings.

D. Work and Material shown on the Drawings and in the Specifications are new and included in the Contract unless specifically indicated as existing or N.I.C. (not in Contract).

E. Keep a copy of all Applicable Codes and Standards available at the Job Site at all times for reference while performing work under this Contract. Nothing in Plans or Specifications shall be construed to permit work not conforming to the most stringent of Building Codes.

F. Where a Conflict or Variation occurs between applicable Codes, Standards and/or the Contract Documents, the provisions of the most restrictive provision shall become the Requirement of the Contract Documents.

1.8 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. General

1. Review of Contractor's submittals is for General Conformance with the Design Concept of the Project and General Compliance with the information given in the Contract

Documents. Any action shown is subject to the Requirements of the Plans and Specifications. Contractor is responsible for quantities; dimensions which shall be confirmed and correlated at the Job Site; fabrication processes and techniques of construction; coordination of work with that of all other trades and satisfactory performance of their work.

2. The Contractor shall review each submittal in detail for compliance with the Requirements of the Contract Documents prior to submittal. The Contractor shall "Ink Stamp" and sign each item of the submittal with a statement "CERTIFYING THE SUBMITTAL HAS BEEN REVIEWED BY THE CONTRACTOR AND COMPLIES WITH ALL THE REQUIREMENTS OF THE CONTRACT DOCUMENTS". The Contractor shall clearly and specifically identify each individual proposed substitution, substitution of equal or proposed deviation from the Requirements of the Contract Documents with a statement "THIS ITEM IS A SUBSTITUTION".
   The burden of research, preparation of calculations and the furnishing of adequate and complete Shop Drawings information to demonstrate the suitability of Contractor's proposed substitutions and suitability of proposed deviations from the Contract Documents is the responsibility of the Contractor.
3. Departure from the submittal procedure will result in resubmittals and delays. Failure of the Contractor to comply with the Submittal Requirements shall render void any acceptance or any approval of the proposed variation. The Contractor shall then be required to provide the equipment or method without variation from the Contract Documents and without additional cost to the Contract.
4. The Contractor at no additional cost or delays to the Contract shall remove any work, material and correct any deficiencies resulting from deviations from the Requirements of the Contract Documents not approved in advance by the Owner prior to commencement of work.
5. Shop Drawings submitted by the Contractor, which are not specifically required for submittal by the Contract Documents, or Contractor Shop Drawings previously reviewed and resubmitted without a written resubmittal request to the Contractor, will not be reviewed, considered, or commented on. The respective Shop Drawing submittal/ resubmittal will not be returned to the Contractor and will be destroyed without comment or response to the Contractor. The respective submittal shall be considered null and void as being not in compliance with the Requirements of the Contract Documents.
6. Refer to Division-1 for Additional Requirements.

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B. Material Lists and Shop Drawings
   1. Provide name of manufacturer, brand name, type and/or catalog number of each item. Listing more than one Manufacturer for any one item of equipment, or listing items "As Specified", without both make and model or type designation, is not acceptable. The right is reserved to require submission of samples of any material whether or not particularly mentioned herein.
   2. Shop Drawings shall be submitted in completed groups of materials (i.e., all lighting fixtures or all switchgear, etc.). The Contractor shall verify dimensions of equipment and be satisfied as to fit and that they comply with all Code Requirements relating to clear working space about electrical equipment prior to submitting Shop Drawings for review. Submittals, which are intended to be reviewed as substitution or departure from the Contract Document s, must be specifically noted as such. The Requirements of the Contract Documents shall prevail regardless of the acceptance of the submittal.
   3. Each Shop Drawing item shall be identified with the Specification Section and paragraph numbers, lighting fixture types and Drawing sheet numbers; the specific Shop Drawing is intended to represent.

4. The time required to review and comment on the Contractor's submittals will not be less than 14 calendar days, after receipt of the submittals at the office of FBA Engineering. The review of Contractor submittals and return to Contractor of submittals with review comments will occur in a timely manner conditioned upon the Contractor complying with all the following:
   a. The submittals contain complete and accurate information, complying with the Requirements of the Contract Documents.
   b. Contractor's submittals are each marked with Contractor's approval "stamp", and with Contractor signatures.
   c. The submittals are received in accordance with a written, Shop Drawing submittal schedule for each submittal. The Contractor distributes the schedule not less than 35-day calendar days in advance of the Shop Drawing Submittals, and the schedule identifies the calendar dates, the Contractor will deliver the various submittals for review.
5. Shop Drawings shall include the Manufacturers projected days for shipment from the factory of completed equipment, after the Contractor releases the equipment for production. It shall be the responsibility of the Contractor to ensure that all material and equipment is ordered in time to provide an orderly progression of the work. The Contractor shall notify the Owner's Representative of any changes in delivery, which would affect the project completion date.
6. Submittal Identification
   a. Each submittal shall be dated: with submittal transmission date; sequentially numbered and titled with submittal contents identification and applicable Specification/Drawing.
   b. Each resubmittal shall be dated: with original submittal date and resubmittal transmission dates; sequentially numbered with original submittal number and sequential resubmittal revision number and titled with submittal contents identification and applicable Specifications/Drawing references.
   c. Contractor shall provide a written response narrative with each resubmittal. Describe each response-action, resubmittal addition, change and deletion. Correspond each response to A/E specific review comment.

C. The Contractor shall be responsible for incidental, direct and indirect costs resulting from the Contractor's substitution of; or changes to; the specified Contract Materials and Work.

D. Maintenance and Operating Manuals
1. The Contractor shall furnish three hard copies plus a pdf copy of type-written Maintenance and Operating Manuals for all electrical equipment, fire alarm equipment, sound system equipment, etc., to the Owner.
2. Instruct Owner's Personnel in correct operation of all equipment at completion of Project. Provide the quantity and duration of instruction class as specified; but in no case less than four 4-hour duration separate instruction classes for each individual equipment group furnished as part of the Contract. Instruction classes shall be presented by Manufacturer's Authorized Field Service Engineer at the Project Site. Instruction class size shall be at the Owner's discretion, not less than one or more than fifteen students shall attend each instruction session.
3. Maintenance and Operating Manuals shall be bound in three-ring, hard-cover, plastic binders with table of contents. Manuals shall be delivered to the Owner's Representative, with an itemized receipt.

E. Portable or Detachable Parts: The Contractor shall retain in his possession and shall be responsible for all portable and detachable parts or portions of the installation such as fuses, keys, locks,

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adapters, locking clips, and inserts until final completion of Contract Work. These parts shall then be delivered to the Owner's Representative with an itemized receipt.

F. Record Drawings (Additional Requirements)
   1. Provide and maintain in good order a complete set of Electrical Contract "Record" prints. Changes to the Contract to be clearly recorded on this set of prints. At the end of the Project, transfer all changes to one set of transparencies to be delivered unfolded to the Owner's Representative.
   2. The actual location and elevation of all buried lines, boxes, monuments, vaults, stub-outs and other provisions for future connections shall be referenced to the building lines or other clearly established base lines and to approved benchmarks. If any necessary dimensions are omitted from the Record Drawings, the Contractor shall, at the Contractor's own expense, do all excavation required to expose the buried work and to establish the correct locations.
   3. The Contractor shall keep the "Record" Prints up to date and current with all work performed.
   4. Refer to Division-1 for Additional Requirements.

1.9 CLEANING EQUIPMENT, MATERIALS, PREMISES

All parts of the equipment shall be thoroughly cleaned of dirt, rust, cement, plaster, etc., and all cracks and corners scraped out clean. Surfaces to be painted shall be carefully cleaned of grease and oil spots and left smooth, clean and in proper condition to receive paint finish.

1.10 JOB CONDITIONS - PROTECTION

Protect all Work, Materials and Equipment from damage from any cause whatever and provide adequate and proper storage facilities during the progress of the work. Provide for the safety and good condition of all the work until final acceptance of the work by the Owner and replace all damaged or defective work, materials, and equipment before requesting final acceptance.

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1.11 EXCAVATION, CUTTING, BACKFILL AND PATCHING ADDITIONAL REQUIREMENTS

A. General
   1. Perform excavation, cutting, backfill, core drilling, directional boring, and patching of the construction work required for the proper installation of the electrical work.
   2. Patching shall be of the same material, thickness, workmanship, and finish as existing and accurately match-surrounding work to the satisfaction of the Owner's Representative.

1.12 IDENTIFICATION

A. Equipment Nameplates
   1. Panelboards, terminal cabinets, circuit breakers, disconnect switches, starters, relays, time switches, contactors, push-button control stations, and other apparatus used for the operation or control of feeders, circuits, appliances, or equipment shall be properly identified by means of descriptive nameplates or tags permanently attached to the apparatus and wiring.
   2. Electrical equipment including switchgear, switchboards, electric panels and control panels, motor starters, transformers, disconnects, etc., shall each be labeled by the Manufacturer with "Electric-Arc-Flash" warning signs. The signs shall explain a hazard to personnel may exist if the equipment is worked on while energized or operated by personnel while energized. The sign shall instruct Personnel to wear the correct Protective Equipment/clothing (PPE) when working "Live" or operating "Live" electrical equipment and circuits.
   3. Nameplates shall be engraved laminated phenolic. Shop Drawings with dimensions and format shall be submitted before installation. Attachment to equipment shall be with

escutcheon pins, rivets, self-tapping screws or machine screws. Self-adhering or adhesive backed nameplates shall not be used.

4. Provide black-on-white laminated plastic nameplates engraved in minimum ¼-inch high letters to correspond with the designations on the Drawings. Provide other or additional information on nameplates where indicated.

B. Plates: Cover and device plates shall be furnished with engraved or etched designations where indicated on the drawings (minimum character size not less than 0.188 inch. Engraving shall indicate circuits and equipment controlled or connected):

C. For Equipment and Access Doors or Gates to Equipment Containing or Operating on Circuits of more than 100 volts AC or DC nominal. Provide red-on-white laminated warning signs engraved in ½-inch high letters to read: "DANGER - 480 VOLTS KEEP OUT AUTHORIZED PERSONNEL ONLY".

D. Wire and Cable Identification

1. Provide identification on individual wire and cable including signal systems, fire alarm, electrical power systems (each individual phase, neutral and ground), empty conduit pull ropes, and controls circuit.
2. Permanent identification shall be provided at each termination location, splice location, pullbox, junction box and equipment enclosure.
   a. Individual wire and cable larger than #6 AWG or 0.25-inch diameter, shall be provided with polypropylene identification tag holders, with yellow polypropylene tags interchangeable black alphanumeric characters, character height 0.25 inch. Attach identification tags with plastic "tie" wraps, minimum of two for each tag. As manufactured by Almetek Industries - "EZTAG" Series; or TECH Products - "EVERLAST" Series.
   b. Individual wire and cable #6 AWG and smaller or smaller than 0.25-inch diameter, shall be provided with water and oil resistant, flexible, self-laminating pressure sensitive machine embossed plastic tags that wrap a minimum of 360 degrees around the wire/cable diameter. The entire tag shall then be covered with a clear flexible waterproof plastic cover wrapped a minimum of 540 degrees around the wire/cable diameter and completely covering the identification. As manufactured by: Brady Identification; or 3M; or Panduit.
   c. Each identification tag location shall indicate the following information: circuit number, circuit phase, source termination and destination termination equipment name (or outlet number as applicable).
3. Install permanent identification after installation/pulling of wire/cable is complete, to prevent loss or damage to the identification.

E. Cardholders and Cards shall be provided for circuit identification in panelboards. Cardholders shall consist of a metal frame retaining a clear plastic cover permanently attached to the inside of panel door. List of circuits shall be typewritten on card. Circuit description shall include name or number of circuits, area, and connected load.

1.13 COMMISSIONING - CX

A. General

1. The Commissioning shall verify the electrical systems for the term of the Contract, by observation; and by calibration; and by testing. The Commissioning shall ensure the electrical systems perform interactively and correctly, according to the Contract and operational Requirements.
2. Commissioning shall provide startup, testing and documented confirmation of the Contract constructed systems, materials and work, functions in compliance within the criteria set forth in the Contract Documents to the satisfaction of the Owner's needs. The

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Commissioning Scope shall encompass each system identified as requiring "Commissioning" by the Contract Documents, including but not limited to:

a. Electrical circuits' protection, short circuit, overcurrent, and ground fault devices.
b. Electrical circuits monitoring and metering.
c. Light fixtures.
d. Lighting control devices, equipment and lighting control systems.
e. Standby and emergency electric power supply equipment and systems.
f. Fire alarm, equipment, devices and fire alarm systems.
g. Additional systems described in the Contract Documents.

3. Commissioning process shall review all of the Shop Drawing submittals, including:
   a. Controls, operation and maintenance Requirements.
   b. Facility performance testing compliance.
   c. Project Contract Requirements compliance.
   d. Compliance with basis for design and operational descriptions provided in the Contract.
4. Commissioning shall be the process of ensuring all the systems described in the Contract Documents comply with the Contract Document Design; all systems are installed properly; all systems are functional, tested and capable of being operated and maintained to perform within the Contract Requirements and design intent.
5. Functional setup, recalibration, correcting deficiencies, retesting and the associated costs, for system(s) that fail commissioning, shall be the responsibility of the Contractor. The Contractor shall include all Commissioning costs in the Contract Scope of Work.
6. Complete all Commissioning functions prior to the occupancy of the facility by the Owner, unless directed otherwise by the Owner's Representative.
7. Submit six copies of Commissioning documentation to Owner's Representative.
8. Commissioning, unless specifically indicated otherwise, shall be performed by Factory-Trained Technician(s) authorized and certified by the Manufacturers of the respective equipment/systems. Where specifically indicated, Commissioning shall be performed by Independent Test Lab.

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B. Commissioning Procedures
1. Prepare a Commissioning Matrix identifying components and systems included in the Commissioning Scope; the status; actions completed and actions to be completed.
2. Verify Contractor compliance with Contract Document Requirements Manufacturer's recommendations and approved Shop Drawings.
3. Perform startup, functional tests, reports, and document results.
4. Evaluate and document the setup parameters, software, operating condition and performance of each system at the time of functional test completion. Document and record each performance parameter and condition, in the Commissioning Report.
5. Schedule testing and prepare descriptions of testing.
6. Describe measures taken to correct deficiencies.
7. Verify that instructions to Owner's Representatives, operations, and maintenance manuals comply with Contract Documents.
8. Prepare warranty matrix identifying the start dates, expiration dates, routine preventative maintenance dates and the Owner's responsibility for performing preventative maintenance and keeping logs for each maintenance function and warranty claims.
9. Confirm completion of all punch list items that have been acceptably accomplished and a list of what has not been acceptably completed.
10. Describe uncorrected deficiencies accepted by the Owner.

C. Commissioning Phasing
The Commissioning Phases of work shall include the following activities:
1. SDQ – Shop Drawing Qualification shall verify complete and correct Shop Drawings have been submitted.
2. IQ – The Installation Qualification of Contract Work shall verify systems are correctly and properly installed.
3. OQ – Verify systems interfaces and software are correctly and properly operational.
4. ITM – Verify the Contract Inspection, Testing and procedures for Maintenance are complete.
5. PQ – Performance Qualification completes the functional performance testing to validate each building system.

1.14 TESTING

A. The Contractor shall obtain an independent Testing Laboratory, provide all instrumentation and perform Tests on the electrical system and equipment as hereinafter described and further directed by the Owner's Representative. The Test shall be performed after the completion of all electrical systems included in the Contract Scope of Work. All Tests shall be recorded and documented and submitted to the Owner's Representative for review.
1. All equipment and personnel required for set-up and testing shall be provided by the Contractor.

B. Test for Phase to Ground and Neutral Condition:
1. Open main supply feeder disconnects.
2. Isolate the system neutral from ground.
3. Close all submain disconnects.
4. Close all branch feeder circuit breakers.
5. Turn all switches to "ON" position, unplug all portable equipment from outlet receptacles.
6. Measure the resistance of each phase to ground and phase too neutral. A properly calibrated "Megger" type Test instrument shall be used. The Test voltage shall be a nominal 500 volts.
7. Record all readings after 1-minute duration and document into a complete report.
8. Isolating Grounds: In the event that low resistance ground neutral connections are found in the system, they shall be isolated and located by testing each circuit individually as outlined above. Make proper corrections to restore the resistance values to an acceptable value.

C. Method of Obtaining Ground Resistance shall be in accordance with the 2006 IEEE Power and Energy Society recommendations:
1. Measure and record resistance to ground of the building UFER ground bus.
2. Measure and record the resistance to ground of the neutral buses in each distribution panel.

D. The Testing, Calibrating, and Setting of all ground and ground fault equipment, circuit breakers, circuit device protection relays, and meters adjustable settings shall be by an independent Testing Laboratory. Set as recommended by the respective Manufacturer and Coordination Study to be coordinated with other protection devices within the electrical design. All circuit breaker settings shall be tested in field for accurate performance. Submit documentation certifying performance.

E. Ampere and Voltage Measurements
1. Measure and record ampere and line voltage measurements under full load on main 480V supply feeder to the building. Readings shall be taken at the load side of the feeder inside the new building.
2. Ampere voltage readings shall be:
a. Phase A-B, A-C and B-C.
b. Phase A-Neutral, B-Neutral and C-Neutral.

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3. The ampere and voltage readings shall be not less than 20 minutes duration for each Test. Record and submit the measured minimum, maximum and 20-minute average for each ampere and voltage value and Test location.
4. Test equipment shall be accurate within plus or minus 1%.
5. Branch circuit devices 40 amp or less and motor loads 10 horsepower or smaller are excluded from ampere and voltage testing Requirement.

F. The Contractor shall complete the following work before any electrical equipment is energized.
1. All equipment shall be permanently anchored.
2. All bus connections and conductor/wire connections shall be tightened per Manufacturer's instructions and witnessed by the project Inspector.
3. All ground connections shall be completed and identified. Perform and successfully complete all required megger and ground resistance tests.
4. Feeders shall be connected and identified.
5. The interiors of all electrical enclosures including busbars and wiring terminals shall be cleaned of all loose material and debris, paint, plaster, cleaners or other abrasives over spray removed and equipment vacuumed clean. The Owner's Representative shall observe all interiors before covers are installed.
6. All wall, ceiling, and floor work and painting shall be completed within areas containing electrical equipment prior to installation of equipment. The equipment indoor rooms and spaces shall be weathertight, and weather protected from environmental incursions.
7. All doors to electrical equipment rooms shall be provided with locks to restrict access to energized equipment.
8. Electrical spaces and rooms shall not be used as storage rooms after power is energized.
9. The electrical system time current Coordination and Arc-Fault Study shall be complete for circuit breakers, ground relays set, and circuit relay sets, fuses; set-up, tested and calibrated accordingly.

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1.15 TIME/CURRENT COORDINATION, SHORT CIRCUIT, ARC-FLASH AND SERIES RATED EQUIPMENT

A. Series Rated Equipment.
1. Circuit Protective Devices identified as "Series Rated" shall be series rated and tested by the Manufacturer with all equipment and circuit protective devices installed downstream of the identified series rated
2. Provide nameplates on all equipment located downstream, including the CLCB and CLF devices, to comply with CEC/NEC "CAUTION SERIES RATED SYSTEM - NEW DEVICE INSTALLATIONS AND REPLACEMENTS SHALL BE THE SAME MANUFACTURER AND MODELS".

B. Short Circuit, Coordination and Arc-Flash
1. Perform Engineering Analysis and submit engineered settings for each equipment location, fuse and circuit breaker device, showing the correct time and current settings to provide selective coordination within the limits of the specified equipment. Shall comply with the latest application Standards of IEEE and ANSI. Provide electrical system short circuit worst case bolted-fault analysis, both 3-phase line-to-line and 1-phase line-to-ground calculations as part of the Coordination Analysis recommendations. Provide Electric Arc-Flash calculations as part of the Coordination Analysis recommendations.
2. The information shall be submitted in both tabular form and on time current log-log graph paper, with an Engineering Narrative. Written narrative describing data, assumptions, analysis of results and prioritized recommendations, six copies.

3. The goal is to minimize an unexpected but necessary electrical system outage and personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment. Shall comply with, but not limited to:
   a. IEEE-242, Recommended Practices for Protection and Coordination of Industrial and Commercial Distribution.
   b. IEEE-399, Recommended Practices for Industrial and Commercial Power System Analysis.
   c. IEEE-1584, Guide to Performing Arc-Flash Hazard Study.
   d. CEC/NEC
4. Provide permanent warning labels on each equipment location. The labels shall describe Arc-Flash, Short-Circuit and Time/Current Coordination, including safety precautions and protective clothing. Also described actions to be taken if any circuit changes or equipment modifications occur.
5. Shall be submitted with the Shop Drawing submittals for the respective equipment.

1.16 INDEPENDENT TESTING LABORATORY

A. Testing Laboratories Definition
   1. The Testing Laboratory shall meet Federal OSHA Criteria for accreditation of Nationally Recognized Testing Laboratories (NRTL) Title 29 Part 1907 and 29 CFR-1910.
   2. Membership in the National Electrical Testing Association (NETA) shall also constitute acceptance of meeting said criteria, for Testing of electrical systems.

1.17 SPARE FUSES

Provide three spare fuses for each size and type to match the installed fuses where the fuses are provided as part of the Contract. Provide spare fuse holders on inside door of each respective fuse compartment. Provide engraved nameplate on front of fuse access door indicating fuse type/ catalog number ampere rating and Manufacturer of fuse.

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1.18 ELECTRICAL WORK CLOSEOUT

A. Prepare the following items and submit to the Owner's Representative before final acceptance.
   1. Two copies of all Test results as required under this Section.
   2. Two copies of Local and/or State Code Enforcing Authority's final inspection certificates.
   3. Copies of Record Drawings as required under the General Conditions, pertinent Division One Sections and Electrical General Provisions.
   4. Two copies of all receipts transferring portable or detachable parts to the Owner's Representative when requested.
   5. Notify the Owner's Representative in writing when installation is complete and that a final inspection of this work can be performed. In the event any defect or deficiencies are found during this final inspection they shall be corrected to the satisfaction of the Owner's Representative before final acceptance can be issued.
   6. List of spare fuses and locations identified by equipment name and building designation.

END OF SECTION 26 05 00
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SECTION 26 05 01 – BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit Product Data Sheets for all outlet boxes, floor boxes, wiring devices, device plates, relays, contactors, safety switches and fuses.

PART 2 - PRODUCTS

2.1 OUTLET AND JUNCTION BOXES

A. General:
   1. Flush or concealed outlet boxes and junction boxes.
      a. Non-masonry and/or non-concrete locations provide pressed steel boxes. Steel thickness not less than 0.062-inch, hot-dip galvanized. Knockout (KO) type with conduit entrances and quantities size to match conduits shown connecting to respective junction box and outlet box.
      b. UL-514 listed and labeled.
      c. Minimum required box depth is exclusive of extension-ring depth.
      d. Provide all boxes with matching cover plates. Cover plates shall be gasketed water-tight in wet and outdoor locations.
      e. Boxes installed in masonry or concrete shall be UL "Concrete-Tight" approved for installation in concrete and shall allow the placing of conduit without displacing reinforcing bars.
   2. Provide boxes of proper Code size for the number of wires or conduits passing through or terminating therein. In no case shall box be less than 4.0-inches square by 2.125-inches deep, unless specified elsewhere or noted otherwise on the Drawings. 2.5-inches minimum depth for box width exceeding 2-gang.
   3. Increase the minimum outlet box size to 4.69-inches square by not less than 2.125-inches deep, where one or more of the following conditions occurs:
      a. More than two conduits connect to the outlet box.
      b. Circuit or Conduit “Homerun” connects to outlet box.
   4. Signal, Communication and Low Voltage:
      a. Computer outlets: 4.69-inches square by 2.125-inches deep minimum with 1-gang extension ring on flush boxes.
      b. Audio-video and theatrical lighting outlets as specified for respective systems and as required by Code.

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5. Junction boxes shall be sized to comply with the following:
   a. Code Requirements size based on the conduit quantities, conduit sizes and wire-fill connected to the junction box.
   b. Junction box minimum size shall not be less than 4.69-inches by 4.69-inches by 2.5-inches deep, but not less than size indicated on the Drawings or required by Code.
6. Provide extension rings on flush outlets to finish face of extension ring flush with finished building surfaces. Extension ring shall match outlet box construction and contain "Attachment Mounting-Tabs" for wiring devices. Extension rings shall be "Screw-Attached" to respective outlet box and maintain "Ground" bonding continuity.
7. Outlet boxes installed in outdoor locations, or in wet locations, or in concrete/masonry, shall be cast-iron or cast-bronze, with threaded conduit hubs. UL rated for wet locations.
   a. Aluminum boxes shall NOT be in contact with concrete or masonry. Die-cast aluminum or cast aluminum water-tight electrical outlet boxes with threaded hubs may be provided as an alternate to cast-iron or cast-bronze outlet boxes, only where one or more of the following conditions occur:
      1) Outdoor locations above finish grade.
      2) Indoor wet locations surface or flush in walls or ceilings.
8. Provide fixture-supporting devices in outlet boxes for surface mounted fixtures as required.
9. Provide solid gang boxes for three or more devices, typically for line and low voltage switches, receptacles, low voltage/signal outlets, etc. for mounting devices behind a common device plate.
10. Provide isolation barriers in outlet boxes between line voltage and low voltage devices.
11. Outlet boxes installed penetrating into fire rated walls, fire rated floors, fire rated ceilings and all fire rated construction. The outlet boxes shall be UL listed, classified and labeled, for fire rated and temperature rated penetration of the respective fire rated surface and fire rated construction. The outlet box fire rating and temperature rating shall equal or exceed the fire/temperature rating of the surface/construction being penetrated. Provide UL listed and labeled supplemental fire and temperature protection to maintain ratings:
    a. Wall and ceiling penetrations, tumescent fire wrap (external or internal outlet box).
    b. Floors provide subfloor supplemental fireproofing below floor box.
12. Outlet boxes installed in floors. The floor outlet boxes shall be UL listed and labeled for scrub water exclusion Requirements, including but not limited to tiles, carpeting and exposed wood and concrete floor fishes.
13. Outdoor flush in wall device outlet boxes:
    a. Flush in wall, gasketed watertight, with hinged key locking cover, tamper resistant.
    b. Flush cast-iron or cast-bronze device back-box, 4.68-inch square by 2.25-inch deep.
    c. Wiring device types in the box as indicated on the Drawings.
    d. As manufactured by Legrand/Pass & Seymour #4600; no known equal.
14. Refer to Architectural and Structural Contract Documents and details for additional Box and Installation Requirements.

B. Surface Outlet Boxes
   1. Surface mounted outlet boxes, cast iron Type FS or FD, with threaded hubs as required. Box interior dimensions and interior volume capacity not less than required for “Press Steel Boxes”, and “Sheet Steel Boxes”. Provide plugs in all unused openings. Provide weatherproof gaskets for all exterior boxes.

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2.2 PULLBOXES

A. General
1. Sizes as indicated on the Drawings and in no case of less size or material thickness than required by the Governing Code and AHJ.
2. Exercise care in locating pullboxes to avoid installation in drain water flow areas and to clear existing condition interferences.
3. UL listed and labeled for electrical circuits.

B. General Purpose Sheet Metal Pullbox
1. General purpose sheet steel pull boxes: Install only in dry protected locations with removable screw covers. Manufacturer's standard rust proofing and baked enamel finishes.
2. Weatherproof sheet steel pull boxes: Fabricate of Code gauge steel. All surfaces interior and exterior hot-dip galvanized steel. Gasketed weather-tight cover of same material. Manufacturer's standard baked exterior enamel finish.

2.3 LINE VOLTAGE SWITCHES

A. General
1. Provide circuit switches totally enclosed, electrical insulating Bakelite or electrical insulating composition base, manual operator type with 277-volt 60Hz AC rating for full capacity contacts rated for all loads. Switch mounting-ears for screw attachment to outlet box. Switches shall be UL listed and labeled; conform to NEMA-WD1 and WD6.
2. Switch ratings shall be 20 amp, unless indicated otherwise.
3. All switches shall be of the same Manufacturer.
4. Wiring devices shall be listed and labeled for connection of both “Solid” and “Stranded” copper circuit conductors.

B. Line Voltage Switches Heavy Duty (Toggle – Type)
1. Single Pole Switches – 20 amp at 277V

Manufacturer	Toggle Type	Lock Type
Hubbell	#HBL1221	#HBL1221-L
Legrand/P&S	#20AC1	#20AC1-L
Leviton	#1221	#1221-L
Cooper-Arrow/Hart	#AH1221	#AH1221-L

2. Double Pole Switch – 20 amp at 277V

Manufacturer	Toggle Type	Lock Type
Hubbell	#HBL1222	#HBL1222-L
Legrand/P&S	#20AC2	#20AC2-L
Leviton	#1222	#1222-L
Cooper-Arrow/Hart	#AH1222	#AH1222-L

3. Three-Way Switches – 20 amp at 277V

Manufacturer	Toggle Type	Lock Type
Hubbell	#HBL1223	#HBL1223
Legrand/P&S	#20AC3	#20AC3-L
Leviton	#1223	#1223-L
Cooper-Arrow/Hart	#AH1223	#AH1223-L

4. Momentary Contact Switches – 20 amp at 277V

Manufacturer	3-Position Regular	3-Position Lock
Hubbell	#HBL1557	#HBL1557-L
Legrand/P&S	#1251	#1251-L
Leviton	#1251	#1251-L
Cooper-Arrow/Hart	#AH (extra)	#AH (extra)

5. Pilot lights used in conjunction with circuit switches shall be LED type with red jewel.

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C. Weather-Proof (W.P.) Switches
1. Outdoor switches provide heavy-duty, tamper resistant gasketed weather-proof metal, hinged door cover for each switch.
2. Cover door shall be key locking-type or padlock-type.

D. Other Switches, Receptacles, Devices, and Outlets
1. Special devices outlets and outlet locations shall be as indicated on the Drawings. Modify device and outlet characteristics to accommodate the actual install location conditions for each outlet.

2.4 LINE VOLTAGE LIGHTING CONTROL DIMMER SWITCHES

A. LED Lamp Dimmers
1. Shall be specifically designed and rated for dimming Solid State Lighting – LED (SSL, Light Emitting Diode), both power supply/drivers and lamps. Dimming compatible solid state electronic power supplies/drivers.
2. LED lamps with self-contained power supplies inside each lamp shall be compatible with the dimming system and the dimming system shall be compatible with the lamp/driver power supply.

2.5 RECEPTACLES

A. General
1. All receptacles in flush type outlet boxes shall be installed with a bonding jumper to connect the box to the receptacle ground terminal. Grounding through the receptacle mounting straps is not acceptable. The bonding jumper shall be sized in accordance with the branch circuit protective device as tabulated herein under "Grounding". Bonding jumpers shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws 6-32 or larger (except isolated ground receptacles). For receptacles in surface mounted outlet boxes direct metal-to-metal contact between receptacle mounting strap (if it is connected to the grounding contacts) and outlet box may be used. Receptacle mounting-ears for screw attachment to outlet box. Receptacle shall be UL listed and labeled; conform to NEMA-WD1 and WD6.
2. All receptacles shall be same Manufacturer.
3. Receptacle colors shall be as selected by OWNER'S Representative. Multiple colors will be required including black for all receptacles on the stage.
4. Wiring devices shall be listed and labeled for connection of both "Solid" and "Stranded" copper circuit conductors.
5. Duplex convenience receptacles and 120-volt single phase branch circuits.
   a. 20-amp branch circuits with a single duplex convenience receptacle connection on each circuit, receptacles shall be rated for 20-amp.
   b. 15-amp and 20-amp branch circuits with two or more duplex convenience receptacle connections each circuit, receptacle shall be rated 15-amp or 20-amp.
   c. All receptacles shall be tamper resistant.
6. Devices shall additionally be listed and labeled as UL-All Weather-Resistant, provide weather and tamper resistant receptacles for the following install locations:
   a. Devices indicated on Drawings as Weatherproof (W.P.).
   b. Devices installed in outdoor locations.
   c. Devices installed in classified as damp or wet locations both indoor and outdoor.
   d. All GFCI (ground-fault) receptacles at all locations.
7. Receptacles with ampere and voltage ratings different than described for duplex convenience receptacles. The different rated receptacles shall have the same characteristics

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and performance as the respective duplex convenience receptacles, except for differing ampere and voltage characteristics.

8. Receptacles located within 72-inches of a sink or hosebib shall be GFCI receptacles.

B. Duplex Convenience Receptacles.

1. Shall be grounding type, 120 volt and shall have two current carrying contacts and one grounding contact which are internally connected to the frame. Outlet shall accommodate standard parallel blade cap and shall be side wired.
2. GFCI receptacles shall be all Weather-Resistant and wet location rated. Rated 120-volt 60Hz AC, 20 amp, unless indicated otherwise on Drawings.
3. Heavy Duty Industrial Grade as follows except tamper resistant as described in Part A.5 above:

	Manufacturer	NEMA 5-15R	NEMA 5-20R	NEMA 5-20R-GFCI
a.	Legrand/P&S . …….	#5262 . . ….	#5362 . …. ..….	.#2095HG
b.	Leviton . . …….	#5262. . …	#5362 …. . ……	.#W7899
c.	Hubbell . . …. ……..	#CR5252…	#5362 . . …..……	#GFR8300
d.	Cooper-Arrow/Hart…	#AH5262.…	#AH5362……	.#WRVGF20

C. Weather-Proof (W.P.) Receptacle

1. Outdoor receptacles shall be duplex convenience GFCI type rated 20-amp 120-volt 60Hz AC weatherproof, GFCI, unless indicated otherwise on Drawings. Test-reset buttons and visual pilot.
2. GFCI receptacles shall be in a wet location and Weather-Resistant rated weatherproof, gasketed, key locking tamper resistant, wet location.
   a. Outdoor, weatherproof locking outlet located under a soffit or building overhang shall be flush mounted with hinged, key locking, weatherproof cover equal to Pass and Seymour/Legrand #4600/ 26P Series.
   b. Weatherproof receptacles not located under soffits or building overhangs shall have weatherproof lockable metal "In-Use" covers equal to Hubbell #MX4280S Series.

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D. Other Switches, Receptacles, Devices, and Outlets.

1. Special devices, outlets and outlet locations shall be as indicated on the Drawings. Modify device and outlet characteristics to accommodate the actual install location conditions for each outlet.

2.6 PLATES

A. Cover Plates for Devices

1. Provide cover plates for every switch, receptacle, telephone, computer, television and other device outlets. Provide cover-plates for junction boxes.
2. All plates shall be unbreakable smooth white plastic as manufactured by P&S, Hubbell, Leviton or General Electric.

2.7 STRUCTURAL AND MISCELLANEOUS STEEL

Structural and miscellaneous steel used in connection with electrical work and located out-of-doors or in damp locations, shall be hot-dip galvanized unless otherwise specified. Included are underground pull box covers and similar electrical items. Galvanizing averages 2.0 ounce per square foot and conforms to ASTM A123.

2.8 FLASHING ASSEMBLIES

A. General

1. Flashing shall be compatible with the material being penetrated and with the pipe passing through the flashing. Coordinate with and comply with Manufacturer's recommendations, for both the flashing and the material being penetrated.

2. Provide lead metal flashing assemblies at all roof penetrations, unless recommended otherwise by Manufacturer.
3. Seal the joint between the flashing and pipe passing through the flashing with waterproofing compound.
4. Lead flashing for roof penetrations, as manufactured by: Santa Rosa Lead Products; or Semco; or Flashco.

B. Storm Collars
1. In addition to penetration flashing, provide a storm-collar counter-flashing for each roof penetration flashing. Shall attach to the structure of the penetration and form a water-tight "Umbrella" counter flashing over the roof penetration flashing.
2. As manufactured by: STD-Storm collars; or ASI-Storm collars.

2.9 SAFETY SWITCHES

A. General
1. Disconnect switches shall all be rated:
   a. 600 volt or 250 volt, as applicable, 60Hz AC.
   b. Quick-make, quick-break, H.P.-rated, lockable.
   c. NEMA Type HD heavy duty.
   d. Fused Class "R", in NEMA Type 3R enclosure, lockable.
   e. Number of poles and amperage as indicated on the Drawings.
2. Provide internal ground-lug and conductor landing lugs, size to match conductors shown on Drawings. Switch access door shall be interlocked with switch to prevent access inside switch when switch is "ON" closed position.
3. Maximum voltage, current, and horsepower rating clearly marked on the switch enclosure and switches having dual element fuses shall have rating indicated on the nameplate.
4. Switch and fuses ampere rating shall also comply with Manufacturer recommendation for the connected load.

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2.10 SPARE FUSE CABINETS

Provide a cabinet mounted in the electrical room and of sufficient size to contain all spare fuses herein before specified. Provide clips (two per fuse) for each spare fuse. Eaton / Bussman or equal. Label cabinet "SPARE FUSES".

2.11 WIREWAY

A. General:
1. Unobstructed lay in type, metal wireway, fittings and connectors UL listed for use as wireway and auxiliary gutter. Length, elbows and "T-S" as shown on Drawings. Minimum cross-section size 4-inches by 4-inches, but not less than shown on the Drawings. Suitable for mounting in any position orientation.

B. Construction:
1. Minimum metal gauge shall not be less than 14 gage.
2. Cover shall be hinged entire length of cover. Cover shall be held in the closed position with bolts and nuts.
3. Provide spring nuts on all hardware fastener penetrations into the interior of the wireway to protect against wire insulation damage.
4. The inside of 90-degree corners in the wireway shall be a 45-degree bevel.
5. Grounding continuity between wireway sections and fittings shall be continuous the entire length of the wireway.

C. Finish:
1. Indoor non-raintight, rust inhibitor phosphatizing base coating and baked enamel finish, Manufacturer's standard color.
2. Raintight outdoor-galvanized metal, with corrosion resistant phosphate primer and baked enamel finish, Manufacturer's standard color, NEMA 3R construction.
3. All hardware shall be plated to prevent corrosion.

PART 3 EXECUTION

3.1 GROUNDING (ADDITIONAL REQUIREMENTS)

A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State of California and local Authorities Having Jurisdiction.
B. Each Pullbox or Any other Enclosure in which Several Ground Wires are Terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.
C. The Maximum Resistance to Ground shall not exceed 25 ohms.

3.2 OUTLET AND JUNCTION BOXES

A. General:
1. Accurately place boxes and securely fastens structural members. Where outlets are shown at same location but at different mounting heights, install outlets in one vertical line. Where outlets are shown at same location and mounting height, mount outlets as close together in a horizontal row as possible. Where the outlet boxes for switches and receptacles are shown at the same location and mounting height, mount in common outlet box with barriers between devices. Provide single-piece multi-gang cover plate for close mounted outlet boxes. Where switches are shown on wall adjacent to hinge side of doors, box shall be installed to clear door when door is fully opened.
2. Flush mounted boxes shall be attached to not less than two parallel studs or structure members by means of metal supports. The support shall span between and attach to the structure members.
3. Boxes above accessible ceilings shall be attached to structural members. Where boxes are suspended, they shall be supported independently of conduit system by means of hanger rods and/or preformed steel channels. Boxes shall be supported independently of all piping, duct-work, equipment, ceiling hanger wires and suspended ceiling grid system.
4. Surface mounted outlets shall be attached to concrete or masonry walls by means of expansion shields.
5. Floor boxes shall be installed at the level with finished floor and within adjustable limits of floor ring.
6. Outlet Box Horizontal and Vertical Separation: Outlet boxes and device outlet rings installed flush in walls shall be horizontally and vertically separated by not less than 24-inches (edge of box to edge of box) from device outlet boxes and rings in common wall surfaces located on the opposite (back) side of the same wall.
a. Where the separation cannot be maintained, provide a solid backing behind and completely enclosing each outlet box.
b. The backing shall extend the width of the wall cavity (i.e., between "Studs" or masonry cells) behind the box and 12-inches above and below the outlet box centerline, completely enclosing the outlet box.
c. The backing shall consist of the following:
1) ⅝-inch thick gypsum board anchored in place for "Stud" wall construction.

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2) Solid "Mortar" to completely fill the outlet box "Cell" behind the box in masonry construction.

7. Provide metal outlet boxes for each device. Install devices in metal outlet boxes. Typical for all wiring devices including switches, receptacles, line voltage devices, and low voltage / signal system devices.

B. Fire Wrap:
1. In fire rated walls and ceilings provide fire rated "Box-Wrap" around the outside of each outlet box placed in fire rated wall or ceiling. Install the fire wrap on exterior of box inside the wall or ceiling, to maintain the fire rating of wall or ceiling with the installed outlet boxes.

3.3 SWITCHES AND RECEPTACLES-DEVICES

A. General
1. Provide outlet boxes for all devices, switches, receptacles, both line-volt-age and low-voltage.
2. Devices installed in wireways shall be installed flush in wireway assembly.
3. Install and screw attach devices into outlet boxes and wireways.
4. Provide ground circuit connections to all devices.
5. Provide branch circuit connections to all devices.
6. Provide Testing and Commissioning for proper operation and phase/ ground connectors.
   a. Test each GFCI device after installation and circuit connection is complete.
   b. Test all devices for correct polarity and proper electrical energization.
7. Install and adjust all cover-plates to be flush and level, with correct device identification.
8. Were one or more devices occurring at the proximity with other similar devices, all the devices shall be “Ganged” under one common cover-plate as follows:
   a. Duplex convenience receptacles with other proximity (within 18-inches) duplex convenience receptacles.
   b. Lighting control switches not exceeding 20-amp switch rating with other proximity (within 18-inches) similar switches.

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B. Line-voltage Plug-In Type Receptacle Installation Orientation:
1. The “Ground-Pin” shall face “down” at the receptacle top location (double duplex) 4-plex, individual and vertically mounted individual duplex receptacles.
2. The “Neutral-Blade” shall face “Up” at the receptacle top location on horizontally mounted duplex receptacles.

3.4 WIREWAY INSTALLATION

Wireway Hangers shall provide clamp type, hanger rod type, direct bolted bracket type from ceiling or walls as indicated on the Drawings and required for field installation locations. Support shall be installed a minimum of 5-feet on center.

END OF SECTION 26 05 01
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SECTION 26 05 33 - CONDUIT AND WIRE

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. General Provisions and Requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

Submit Product Data Sheets for all Wire, Supports, Conduit, Fittings and Splicing Materials.

PART 2 - PRODUCTS

2.1 CONDUIT

A. General
   1. The interior surfaces of conduits and fittings shall be continuous and smooth, with a constant interior diameter. Conduits and conduit fittings shall provide conductor raceways of fully enclosed circular cross section. The interior surfaces of conduits and fittings shall be without ridges, burrs irregularities or obstructions. Conduits and fittings of the same type shall be of the same uniform weight and thickness.
   2. All fittings for metal conduit shall be suitable for use as a grounding means, pursuant to the applicable Code Requirements.
   3. Steel conduits shall have protective corrosion resistant hot-dip galvanized zinc coating on all interior and exterior surfaces, with clear organic polymer outer topcoat layer. Threads shall be hot-dip zinc coated after machine fabrication.
   4. Threads for metal conduit and metal conduit fittings shall be taper-pipe-thread, National Pipe Standards (NPS) and shall comply with ANSI-B1.20.1.
   5. Metal conduit termination connector fittings shall be provided with a Manufacturer installed, insulating throat bushing inside the fitting. The bushing shall protect the wire conductor insulation from cutting, nicks and abrasion during conductor installation and electrical load "cycling" after installation is complete. The bushing shall comply with UL 94V-0 flammability.
   6. Provide conduit bonding/grounding jumper from metal enclosures with "Concentric Ring" knockouts, to positively ground/bond each respective conduit(s) to the metal enclosure.

B. Rigid Metal Conduit (RMC)
   1. Rigid metal, round tubing, machine threaded at both ends and rated for use as an equipment grounding conductor pursuant to applicable Codes.
   2. RMC raceway types shall be Rigid Galvanized Steel Conduit (RGS) and/or Intermediate Steel Conduit (IMC).
   3. RMC fittings shall be steel and compatible with RGS and IMC, rated for use as an equipment grounding conductor pursuant to applicable Codes.
      liquid and concrete tight, and appropriate for each application used.

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C. Electrical Metallic Tubing (EMT)
   1. Rigid metal round tubing, "Thin Wall" steel construction, with non-threaded ends, and rated for use as an equipment grounding conductor pursuant to applicable Codes.
   2. EMT fittings shall be steel and compatible with EMT, rated for use as an equipment grounding conductor pursuant to applicable Codes. Couplings and connectors shall be exclusively compression type. Set screw type connectors shall not be used.

D. Flexible Metal Conduit (FMC)
   1. Round flexible conduit, fabricated from a single continuous steel strip. The steel shall be factory formed into continuous interlocking convolutions to form a complete lock between steel strips and provide raceway flexibility.
   2. FMC Fittings shall be malleable iron construction or steel and shall automatically cause the FMC raceway throat opening to be centered with respect to the fitting throat opening. Direct FMC conduit-to-FMC conduit coupling of FMCs shall not be permitted.

E. Liquid Tight Flexible Metal Conduit (LTFMC)
   1. The metal conduit core of LTFMC shall comply with the same Requirements as FMC conduit, with the addition of a thermoplastic exterior flexible jacket over the metal core.
   2. The exterior jacket shall be positively locked to the metal core to prevent jacket "Sleeving".
   3. The LTFMC shall be rated for installation and operating service temperatures of between minus 20 degrees centigrade through plus 90 degrees centigrade.
   4. The LTFMC jacket shall be suitable for continuous exposure to sunlight, rainwater, water vapor, mineral oils and liquid solvents, without penetrating into the conduit and without deteriorating the jacket.
   5. Direct LTFMC conduit-to-LTFMC conduit coupling of LTFMC shall not be permitted.
   6. LTFMC fittings
      a. Fittings shall include an external mechanical ground/bond wire connector.
      b. The attachment of the fitting to LTFMC shall be threaded compression type onto the conduit core with locknut and liquid tight jacket compression seal. The fitting shall automatically prevent "Sleeving" of the jacket.

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F. Rigid Non-Metallic Conduit (RNMC)
   1. General
      a. Conduit and fittings shall be 90-degree centigrade conductor rated. Fabricated from homogeneous material, free from visible cracks, holes or foreign inclusions, with integral "End-Bell". The conduit and conduit fittings shall be watertight and airtight.
      b. Conduit, conduit fittings and conduit fitting assembly "Solvent Cement" shall all be the product of the same Manufacturer. Conduit fittings shall be solvent cement welded watertight.
      c. Conduit and fittings shall be identified with legible markings showing ratings, size and Manufacturers name.
      d. RNMC and fitting shall be corrosion resistant, watertight.
      e. Conduit shall be suitable for conductor operating temperatures from minus 20 degrees centigrade to 90 degrees centigrade.
      f. RNMC shall comply with NEMA TC-2 (PVC 40 conduit, latest revision) and NEMA TC-3 (fittings, latest revision); UL 514 and UL 651 (latest revision).
   2. Polyvinyl Chloride (PVC)-RNMC shall be PVC-schedule 40 heavy wall construction.

G. Expansion Joint, Deflection Joint and Seismic Joint Conduit Fittings
   1. Expansion Conduit Fitting - Fitting shall provide for a minimum of 2-inches straight line movement between two connecting conduits in each direction (total 4-inches conduit expansion and contraction) parallel to the respective conduit lengths. Fitting shall be watertight.

2. Deflection Conduit Fitting - Fitting shall provide for a minimum of 30 degrees angular deflection movement ("Shear" deflection) between two connecting conduits, in any direction perpendicular to the length of the respective conduits. Fitting shall be watertight.
3. Combination Expansion/Deflection Conduit Fitting - Fitting shall provide the combined "expansion" and "deflection" movement capacity between two connecting conduits as described for separate "expansion" and "Deflection" conduit fittings. Fitting shall be approved for installation concealed in both masonry/concrete construction and exposed non-masonry/concrete construction. Fitting shall be watertight.
4. Fittings shall comply with UL.
5. Conduit fitting bonding jumper:
    a. The grounding/bonding path of metal conduit shall be maintained by the fitting.
    b. Provide a bonding jumper at each expansion, deflection, and combination expansion deflection conduit fitting.
    c. The jumper shall be a bare flexible copper "Braid". The copper braid electrical current carrying capacity shall be equal to the metal conduit.
    d. Provide a factory terminated ground clamp on each end of the braid with adjusting steel conduit grounding clamps and connect to each respective conduit end.

H. Conduit Bodies Conduit Fitting
1. Conduit bodies shall provide conductor access with a removable conduit body cover and wiring area enclosed in metal housing. The conduit body shall facilitate pulling conductors.
2. In-line form "C" conduit bodies shall be prohibited.
3. The interior space "length" of 90 degree "Elbow" conduit bodies shall not be less than six times the diameter size of the largest conduit connecting to the conduit body.
4. Conduit body covers shall be removable, gasketed; watertight "Domed" metal covers "Mogul-Type" with threaded screw attachment to the conduit body.

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2.2 CONDUIT SUPPORTS

A. General
1. Conduit Supports, hangers and fasteners for metal conduit shall be steel, hot dip zinc galvanized.
2. Threaded hardware shall be continuous, free running threads.
3. Conduit support systems, including support channels, pipe clamps, braces, anchors, hardware, fasteners, shall be sized to support the full capacity circuit conductors' weight, plus the installed conduit weight, plus the conduit fitting weight and support hardware weight, plus a 300 percent additional weight capacity safety factor.
4. Provide lock washer at each "bolted"/threaded connection.
5. Conduit supports, fasteners, channels, braces, hardware, anchors, pipe clamps, and hangers as manufactured by Unistrut or Kindorf.
6. Supports shall be free of "BURRS" and sharp edges.
7. Metal supports cut in the field shall be zinc galvanized after cutting to prevent rust.

B. Conduit Hangers
1. Threaded steel hanger rods.
    a. Hanger rods smaller than 0.375-inches in diameter shall not be used for support of individual conduits.
    b. Hanger rods smaller than 0.5-inches in diameter shall not be used for support of multiple conduits.
2. Conduit hanger wires shall be not less than 12-gauge steel.

3. Conduit hangers shall attach to structure fasteners with steel "Clevis" or "Swing" hangers and shall provide a minimum of 45 degrees of angular movement in any direction at the point of the conduit hanger attachment to the structure fasteners.
4. Conduits individually suspended by conduit hangers shall fasten to the respective hangers with "Clevis" type pipe hangers. The pipe hangers shall be steel, adjustable to fit conduit size and shall completely enclose the conduit circumference.

C. Conduit Support Channels
1. "C" Channels shall be factory preformed with a minimum 12-gauge thickness metal. The channel shall be factory "Punched" with regularly spaced slotted holes for fastener attachments along the length of the channel.
2. Conduit support channels suspended from conduit hangers shall attach to conduit hangers with treaded connections. Provide a minimum of two hangers (trapeze style) connected to each channel.
3. Non-suspended conduit support channels shall connect to structure fasteners with threaded connectors.

D. Fasteners, Seismic Earthquake Rated
1. Channel fasteners:
   a. Channel fasteners shall "prelocate" and lock into the channel "turned lips" and channel "walls".
   b. A separate metal strap shall "tie" each conduit to each channel with conduit channel fasteners.
2. Structure fasteners:
   a. Structure fasteners for wall and floor mounted conduit attachments shall attach to existing masonry and concrete structures with structure fasteners using drilled, mechanical, expansion shield anchors.
   b. Structure fasteners for wall and floor mounted conduit attachments shall attach to new masonry and concrete structures with structure fasteners using steel threaded inserts precast into the structures.
   c. Structure fasteners shall center the support load above or below the beam flanges and reduce torsion-rotation forces exerted on the structural beam. Attach to steel structural members with "Swing-Beam Clamps", with set-locking screw structure fasteners.
      1) Beam clamps shall include integral safety rod, strap or "J"-Hook to secure the attachment clamp to the beam flanges on both sides of the beam, with integral hanger rod attachment.
      2) Or double-ended beam clamp to secure the attachment clamp to the beam flanges on both sides of the beam, with integral hanger rod attachment.
   d. Structure fasteners for wall and floor mounted conduit attachments shall attach to wood structural members with flush "Through-Bolted" wood beam/wood framing stud structure fasteners.
   e. Structure fasteners for wall mounted conduit attachments shall attach to steel framing studs and steel structural elements with spot welded steel structure fasteners or drilled and bolted structure fasteners.

E. Brace Connectors
1. Provide lateral brace connectors to resist horizontal, lateral and vertical movement of suspended conduits during seismic earthquakes.
2. The braces shall connect from each conduit support, attach as close to the conduit as possible, and attach to fixed rigid, non-suspended building "Main" structural elements with fixed anchoring.

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3. Brace attachment connectors and fasteners shall be rigid preformed steel channels or flexible #10-gauge steel hanger wire.
4. Connect and attach the brace connectors to fixed structural elements in the same manner as conduit support hangers. The connection of braces to structural elements shall be independent of the conduit support hanger structure fasteners.

2.3 ELECTRICAL POWER WIRE AND CABLE

A. General
1. All wire and cable shall be single-conductor, annealed copper, insulated 600 volt, #12 AWG minimum unless specifically noted otherwise on the Drawings. Aluminum conductors shall not be used.
2. Conductors #12 AWG and smaller shall be solid. Conductors #10 AWG and larger shall be stranded.

B. Conductor Insulation
1. 600 Volt AC and/or DC insulated conductors installed entirely inside conduits, or enclosed inside wireways, or enclosed inside raceways, insulation shall be rated as follows.
   a. Indoor above Grade locations either concealed or exposed.
      1) Dual rated THHN and THWN
      2) Individually rated THHN-2
      3) Individually rated THWN-2
      4) XHHW-2
   b. All other enclosed raceway locations not described above.
      1) XHHW-2
      2) THWN-2
      3) THW-2

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C. Insulation Color Coding and Identification
1. The following color code for branch circuits:
   a. Neutral . . . White (Tape feeder neutrals with white tape near connections)
   b. Normal Power

120/208 Volt	480/277 Volt
Ground Green	Ground Green
Phase A Black	Phase A Brown
Phase B Red	Phase B Orange
Phase C Blue	Phase C Yellow

2. The color code for the neutral conductors shall be as follows:
   a. 120/208 volt; Phase A - White with Black stripe; Phase B - White with Red stripe; Phase C - White with Blue stripe.
   b. 277/480 volt; Phase A - White with Brown stripe; Phase B - White with Orange stripe; Phase C - White with Yellow stripe.
3. Feeders identified as to phase or leg in each, switchboard, switchgear, panelboard and junction location with printed identifying tape.
4. Fire alarm conductors: Use 600-volt, type THHN-2/THWN-2 conductors and color-coded per Equipment Manufacturer's recommendations and approved and listed for use on fire alarm systems by the State Fire Marshal.
5. Color coding for mechanical and plumbing control wiring shall be an agreed upon color code between the Mechanical / Plumbing Contractor and the Electrical Contractor.

PART 3 - EXECUTION

3.1 TRENCHING, FOOTINGS, SLEEVES

A. Provide Trenching, Concrete Encasement of Conduits, Backfilling, and Compaction for the underground electrical work, in accordance with applicable Sections of this Specification.

B. Provide Footings for all Post and/or Pole-Mounted Lighting Fixtures: concrete shall conform to the applicable Sections of this Specification.

C. Sleeves

1. Provide sleeves for raceways, conduit and wire/cables passing through the following construction elements:
   a. Concrete and masonry foundations, floors, walls and slabs.
   b. Gypsum, Lath, and plaster walls and ceilings.
   c. Building structures (i.e., foundations, walls, floors, ceilings, beams, and roofs) with a fire rating exceeding 20-minutes.
2. Sleeves shall extend 1.5-inches above and below floors, except under floor standing electrical equipment. Sleeves shall be flush with wall ceiling foundations and partitions exposed to public view and extend approximately 0.5-inches past penetration in fire rated construction. Sleeves shall be installed at exact penetration locations and angles to accommodate wire/cable, raceway and conduit routings.
3. Joists, girders, beams, columns or reinforcing steel shall not be cut or weakened. Where construction necessitates the routing of conduit or raceways through structural members, framing or footings, written permission to make such installation shall first be obtained from the Owner's Representative. Such permission will not be granted, however, if any other method of installation is possible.
4. The layout and design of raceways and conduits located in or routed through masonry or reinforced beams or the Owner's Representative shall review walls before any work is performed. All sleeving shall be accomplished according to the instructions of the Owner's Representative and shall be accepted before any concrete is poured.
5. Sleeves, raceways and conduit shall be located to clear steel reinforcing bars in beams. Reinforcing bars in walls shall be offset to clear piping and sleeves.
6. Provide a continuous clearance between the inside of a sleeve and exterior of wire/cables, conduits and raceways passing through the sleeve not less than the following:
   a. 0.5-inch clearance except as required otherwise.
   b. 1.0-inch clearance through outside walls below grade.
   c. 3.0-inch clearance through seismic joints.
7. Sleeves set in fire rated construction shall be caulked between sleeve and building structure, additionally sleeves shall be caulked between the sleeve and the wire/cables, conduits/raceways passing through the sleeve. The caulking shall be a fireproof sealant, equal to the fire rating and temperature being penetrated. Clearance between components inside of sleeve and exterior of components passing through sleeve and between components inside the sleeve shall comply with Fireproof Sealant Manufacturer's recommendations.
8. Sleeve material:
   a. In floor construction: Schedule 40 black steel pipe, with upper surface to be sealed watertight.
   b. In concrete or masonry walls roofs or ceilings: Schedule 40 black steel pipe. When installed in roofs or outside walls, seal outer surface watertight.
   c. In fire rated construction; 24-gauge galvanized iron or steel.

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d. Sleeves through waterproof membranes: Cast iron or Schedule 40 steel with flashing clamp device and corrosion resistant clamping bolts. Caulk space between pipe and sleeve and surfaces between sleeve and conduits sealed watertight.

3.2 GROUNDING

A. Grounding shall be executed in accordance with all applicable Codes and Regulations, both of the State and local Authorities Having Jurisdiction.

B. Provide proper sized copper ground wire in the conduit with the feeder for use as an equipment ground. Metallic raceway systems shall be grounded to this ground wire.

C. The Maximum Ground/Bond Resistance to the Grounding Electrode shall not exceed 1 ohm from any location in the electrical system. The maximum ground resistance of the grounding electrode to earth shall not exceed 25 ohms.

D. Ground/Bond Conductors

1. Provide dedicated green insulation equipment ground/bond wire inside each conduit type and raceway as follows. Size the ground/ bond conductors to comply with CEC/NEC Requirements. The metal conduit or raceway shall not be permitted to serve (function) as the only (exclusive) electrical ground return path:
   a. All types of nonmetallic conduit and all types of non-metallic raceways including but not limited to: RNMC - Rigid Nonmetallic Conduit.
   b. FMC - Flexible Metal Conduit.
   c. LTFMC - Liquid Tight Flexible Metal Conduit.
   d. Metal and non-metal raceways.
   e. RMC - Rigid Metal Conduit.
   f. EMT - Electrical Metal Tubing.
2. The equipment ground/bond wire shall be continuous from the electrical circuit source point of origin to the electrical circuit end termination utilization point as follows:
   a. Every conduit and raceway path containing any length of the above identified conduits or raceway.
   b. Every conduit path and raceway path connected to any length of the above-identified conduits and raceways.
4. Splices in ground/bond wires shall be permitted only at the following locations:
   a. Ground buses with listed and approved ground lugs.
   b. Where exothermic welded ground/bond wire splices are provided.
5. Provide ground/bond wire jumpers for conduit fittings with ground lugs, expansion and deflection conduit fittings at conduit fittings connecting between metallic and non-metallic raceways and to bond metal enclosures to conduit fittings with ground lugs.

E. Ground Conductors for Branch Circuit Wiring shall be attached at each outlet to the back of the box using drilled and tapped holes and washer head screws, 6-32 or larger.

F. Each Panelboard, Switchboard, Pullbox or any other Enclosure in which several Ground Wires are Terminated shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug.

G. UFER Ground

1. Provide main ground system(s) of the UFER ground style as indicated on the Drawings.
2. The "UFER" grounding electrode, embedded in concrete, shall be exothermically welded to each steel reinforcing bar (rebar) and each steel anchor bolt located within 18-inches of the grounding electrode inside the concrete. Note: Reinforcing steel (rebar), in concrete foundations, attached with metal "Tie-Wraps" and in direct physical contact to other adjacent rebar that is in turn exothermic welded to the UFER grounding electrode, may be

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classified as attached to the UFER grounding electrode, and does not require additional exothermic weld connections to the UFER grounding electrode.

3. Provide a Separate Ground/Bond Insulated Grounding Electrode Conductor, Copper Wire from the UFER ground bus in each building to each location indicated on the drawings. Bond the UFER ground bus to the main cold-water pipe and fire sprinkler service (where applicable) serving the building.

3.3 CONDUIT

A. General

1. The sizes of the conduits for the various circuits shall be as indicated on the Drawings, but not less than the conduit size required by Code for the size and quantity of conductors to be installed in the conduit.
2. Conduits shall be installed concealed from view. Install conduits concealed in walls, concealed below floors and concealed above ceilings, except as specifically noted otherwise. Conduits shall not be installed embedded in concrete floors.
3. The following systems shall be considered as circuits 100 volts and less, all other circuits shall be considered to be over 100 volts (power circuits) unless specifically noted otherwise: Fire alarm, energy management control, telephone, public address, data, computer, television, intercom, intrusion alarm and nurse call.
4. Conduits shall be provided complete with conduit bends, conduit fittings, outlet boxes, pullboxes, junction boxes, conduit anchors/supports, grounding/bonding for a complete and operating conductor/wire raceway system.
5. Metal and nonmetal conduits shall be provided mechanically continuous between termination connection points. Metal conduit shall be provided electrically continuous between termination connection points.
6. Individual conduit paths and home runs shown on the Drawings shall be maintained as separate individual conduits for each homerun and path.
7. Transitions between conduits constructed of different materials and occurring in above grade locations shall be allowed only at outlet boxes, junction boxes, pull boxes and equipment enclosures unless specifically indicated otherwise. Provide outlet boxes and junction boxes.
8. Metal conduit terminating to nonmetal enclosures; terminating into metal enclosures with “Concentric.ring” knockouts; terminating into metal enclosures with knockout reducing washers, including but not limited to equipment housings, outlet boxes, junction boxes, pull boxes, cable trenches, manholes, shall be provided with a ground/bonding lug integrated with the conduit termination conductor fitting construction, by the Fitting Manufacturer. The lug shall provide for connection of a grounding/bonding conductor (insulated or uninsulated). The grounding lug shall be located on the fitting, inside the termination enclosure.
9. The type of conduit, type of conduit fittings, and type of conduit supports, and method of conduit installation shall be suitable for the conditions of use and conditions of location of installation based on the Manufacturer’s recommendations; based on the applicable Codes and based on the Requirements of the Contract Documents.

B. RMC Installation Locations

RGS, IMC conduits and RGS, IMC fittings shall be installed in the following locations:

1. Embedded in floors, walls, ceilings, roofs, foundations, and footings constructed with concrete.
2. Embedded in walls and foundations constructed with brick and masonry.
3. Interior of buildings, within 9-feet of finish floor lines for exposed conduit locations.
4. Exterior of building for exposed conduit locations.

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5. Damp or wet locations exposed or concealed locations.
6. Exposed on roofs.
7. Exposed on utility service poles, for pole risers less than 9-feet above finish grade.
9. RMC conduit and RMC fittings may be installed in any location where EMT and FMC conduit is permitted to be installed.

C. EMT Installation Locations

EMT conduit and EMT fittings may be installed in the following locations, for circuit conductors operating below 600 volts to ground; locations containing only "Non-Hazardous Materials"; only dry locations:

1. Concealed in hollow non masonry/non-concrete, metal stud frame and wood stud frame walls and floors.
2. Concealed above ceilings.
3. Exposed inside interior enclosed crawl spaces.
4. Exposed interior locations placed 9-feet or higher above finished floors (except as described in paragraph below at lower heights).
5. Exposed on walls and ceilings (any height) in the following dedicated function areas, interior enclosed room locations:
   a. Indoor enclosed electrical equipment rooms and closets.
   b. Indoor enclosed data and telecommunication terminal rooms and closets.
   c. Indoor enclosed HVAC equipment rooms and closets.
6. Any location where FMC is described to be installed, except as the final connection to rotating or vibrating equipment.

D. FMC Installation Locations

FMC conduit and FMC fittings may be installed in the following locations for circuit conductors operating below 600 volts to ground; locations containing only "Non-Hazardous Materials"; only dry, interior locations:

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1. Concealed in hollow non-masonry metal stud frame and wood stud frame fully enclosed walls.
2. Concealed above fully enclosed ceiling spaces.
3. FMC conduit shall be installed in continuous lengths between termination points. FMC shall not be "spliced" or coupled directly to FMC or any other conduit type under any circumstance.
4. The maximum continuous length of FMC that shall be installed between termination end points is 15-feet. Circuits requiring continuous conduit lengths exceeding 15 feet between termination end points shall be installed using either RMC or EMT conduits. FMC lengths shorter than 16-inches are prohibited.
5. The minimum size FMC conduit shall be as shown on the Drawings but not be less than the following:
   a. FMC lengths of 6-feet or less, minimum FMC conduit size shall be 0.50-inch.
   b. FMC lengths exceeding 6-feet, minimum FMC conduit size shall be 1.0-inch.

E. LTFMC Installation Locations

LTFMC conduit and LTFMC fittings shall be installed in the following locations for circuit conductors operating below 600 volts to ground; locations containing only "Non-Hazardous Materials":

1. Final electrical connection to vibrating or rotating equipment; control and monitoring devices mounted on vibrating and rotating equipment including the following. Minimum conduit length shall not be less than 24-inches:
   a. Motor, engines, boilers, solenoids, and valves.
   b. Fixed mounted "Shop" (manufacturing) production equipment.
   c. Fixed mounted food preparation equipment and "Kitchen" equipment.

2. All locations where exposed flexible conduit connections are required, both indoor and outdoor.
3. Final connection to indoors electrical transformers. Minimum conduit length shall not be less than 24-inches; maximum conduit length shall not exceed 72-inches.
4. Do not install LTFMC located in environmental air plenums.

F. RNMC Installation Locations

RNMC conduit and RNMC fittings shall be installed in the following locations containing only "Non-Hazardous Material":

1. Underground, concealed below earth grade, unless specifically noted or specified otherwise.
2. Non-metal type raceways and RNMC type conduit shall not be installed inside buildings.

G. Conduit Installation

1. Conduit Supports
   a. Securely and rigidly support all raceways/conduits from the building structure. Raceways/Conduits shall be supported independent of all piping, air ducts, equipment ceiling hanger wires, and suspended ceiling grid systems. Secure conduit to structural element by means of UL listed and approved hangers, fasteners, "C" Channels and pipe clamps.
   b. Provide conduit supports spaced along the length of the conduit as follows:
      1) RMC and EMT conduit, maximum not to exceed 96-inches on center; within 24-inches of each conduit bend and conduit termination location.
      2) FMC and LTFMC conduit, maximum not to exceed 24-inches on center; within 6-inches of each conduit bend and conduit termination location.
   c. Suspended conduit methods:
      1) Individual, suspended raceways/conduits separated by more than 12-inches from any other conduit and suspended from ceilings and roofs shall be supported as follows:
         a) Conduits smaller than 1.5-inches by means of hanger rods or hanger wires.
         b) Conduits 1.5-inches and larger by means of hanger rods.
         c) The conduit shall attach to the hangers with pipe clamps.
      2) Suspended raceways/conduits positioned within 24 inches of any other conduit shall be grouped and supported by hanger rods using trapeze type conduit support channels ("C" channels). Conduits shall individually attach to common channels side-by-side, with pipe clamps.
   d. Non-suspended conduit methods:
      1) Individual raceway/conduits placed against wall/ceiling/ floors, placed inside hollow wall/ceiling construction or structure framing (i.e., "Dry- Wall" or plaster hollow wall construction), shall be secured by means of individual pipe clamps and fasteners attached to the framing studs or other structural members and the conduit/raceway.
      2) Provide common "C" Channel supports for all multiple raceways/conduits placed against vertical or horizontal surfaces and positioned within 24-inches of other raceways/ conduits. Attach channels to the framing studs or other structural members. Attach the conduits/raceway individually to common channels, side-by-side, with pipe clamps.
      3) The use of toggle bolts is prohibited.
   e. Conduit rising from floor for motor connection shall be independently supported if extending over 18-inch above floor. Support shall not be to a motor or ductwork, which may transmit vibrations.

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f. Conduit shall not be installed in cast-in-place concrete floor slabs.

2. Conduit separation:
   a. Conduit installed underground or below building slab without full concrete encasement: Shall be separated from adjacent conduits of identical systems (i.e., signal to signal, data to data, power to power, control to control etc.) by a minimum of 3-inches. Conduits of non-identical systems (i.e., signal to power; data to power; power to control; signal to control, etc.) shall be separated by a minimum of 12-inches.
   b. Conduit installed underground with full concrete encasement; shall be separated from adjacent conduits of similar systems (100 volt and less) by a minimum of 2-inches; conduits for non-power systems (100 volts and less to ground) shall be separated by a minimum of 6-inches from power circuits (over 100 volts to ground); conduits for power circuits shall be separated from adjacent conduits of similar power systems (over 100 volts to ground) by a minimum of 3-inches.
   c. Separation of conduits entering termination points or crossing other conduits may be reduced as required within 60-inches of the termination or crossing points.
   d. Conduits containing Utility Company service circuits (i.e., electrical power, telephone, or cable television) shall be separated a minimum of 12-inches from all other utilities and conduits, with or without concrete encasement, metallic or non-metallic conduit, above grade or underground conduit locations.
   e. Conduits shall be separated from hot water piping, exhaust flues/ chimneys, steam piping, boilers, furnaces, ovens by a minimum of 12-inches.

3. Conduit stubs:
   a. Branch circuit and telephone conduits turned up from floor at the following locations shall terminate each conduit in a flush conduit coupling at the floor and then extend into partition or to equipment. Refer to Owner's Representative's Drawings for location of walls and partitions.
      1) Interior demountable partitions.
      2) Below, into or adjacent to equipment not installed directly adjoining to a wall.
   b. Conduits stubbed underground outside of building line for future use shall be terminated a minimum of 5-feet clear (whichever distance is greater) of building or adjacent concrete walks and AC paving. The stubout conduit shall be capped. Provide concrete monuments, 6-inches by 6-inches by 15-inches deep, buried flush with grade over the capped ends. The face of monument shall be furnished with 3-inch square brass plates securely mounted and engraved with the number and size of conduits and type of service (i.e., "POWER", "TEL.", etc.).
   c. Conduits stubbed between accessible ceiling spaces for low voltage cabling shall be provided with an insulated throat bushing, on the end of each conduit.
   d. Conduit stubouts from outlet boxes and equipment located in hollow stud walls, into ceiling and floor spaces, shall be EMT or RMC conduit. The stubouts shall terminate into the ceiling and floor spaces with a conduit termination connector fitting.
   e. Empty conduit stubs into building spaces and equipment shall be individually identified with an "ID-tag" located at each end of the conduit. The ID-tag shall state the origination point and termination point of the respective conduit (i.e., "from PNL-A/to Room #121"; "from outlet #24/to outlet #17 in Room #120"; etc.).
   f. Provide a conduit termination fitting with insulated throat bushing and mechanical ground lugs at each conduit "stub-up" location.

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4. Conduit concrete encasement:
   a. Conduits larger than 1" which are run underground exterior to building slab shall be continuously concrete encased except where run under paved areas.
   b. Conduits located below or adjacent to structural foundations shall be separated from the foundation by a minimum of 12-inches. Conduits located below structural foundations shall be fully and continuously concrete backfilled and encased between the bottom of the foundation to the bottom of the conduits. The concrete shall be 4000 PSI 28-day cure strength.
5. Underground conduits:
   a. Three or more underground conduits larger than 1-inch in size and occupying the same trench shall be separated and supported on factory fabricated, non-metallic, duct/conduit support spacers. The spacers shall be modular, keyed interlocking type, "Built-Up" to accommodate quantity, size orientation and spacing of installed conduits. The spacers shall maintain a constant distance between adjacent conduit supports and hold conduits in place during trench backfill operations. Minimum support spacer installation interval along with length of the conduits shall be as follows:
      1) Concrete encased conduits, not less than 8-feet on center.
      2) Non-concrete encased conduits, not less than 5-feet on center.
   b. Provide trenching, excavation, shoring and Backfilling required for the proper installation of underground conduits. Tops of backfill shall match finish grade.
   c. Bottoms of trenches shall be cut parallel to "Finish Grade" elevation. Make trenches 12-inches wider than the greatest diameter of the conduit.
   d. Back-filling Trenches for Conduits without Concrete Encasement:
      1) Conduits which are not required by the Contract Documents to be concrete encased and are located exterior to building slab, shall be set on a 3-inch bed of damp clean sand. Conduit trenches shall be backfilled to within 12-inches of finished grade with damp sand after installation of conduit is completed. Remainder of backfill shall be native soil or as specified for type of finished surface on grade.
      2) Conduits located under a building which are not required by the Contract Documents to be concrete encased, shall be completely backfilled and compacted with clean damp sand to the same level as the building foundation pad.
      3) Provide a continuous red wide flat plastic tracer tape with magnetic stripe located 12-inches above the conduits in the trench. The tracer tape shall be imprinted with "Warning-Electric Circuits" a minimum of 24-inches on center.
   e. Backfilling trenches for conduits with Concrete Encasement Requirements by the Contract Documents:
      1) Trenches with all conduits concrete encased shall be back-filled with clean damp sand when located under building pads.
      2) Trenches with all conduits concrete encased and not located under a building pad and not located under paved areas shall be backfilled with clean damp sand or native soil.
   f. Backfill material:
      1) Sand and native soil backfill of trenches shall be machine vibrated in 6-inch lifts to provide not less than 90% compaction of backfill.
      2) Concrete and slurry mix shall be machine vibrated during installation to remove "Air-Voids".

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3) Soil shall have no stones, organic matter of aggregate greater than 3-inches.
4) The slurry mix shall consist of concrete, clean sand and clean water mixture. Maximum shrinking of slurry mix shall not exceed 5% wet to dry.

g. Do not backfill until Owner's Representative has approved Installation and As-Built Drawings are up to date. Promptly install conduits after excavation has been done, so as to keep the excavations open as short a time as possible. Excess soil from trenching shall be removed from the site.

h. Install underground conduit, except under buildings, not less than 24-inches below finished grade in non-traffic areas and 30-inches below finished grade in traffic areas, including roads and parking areas. Not less than 48-inches below finished grade under public/ private transit system right of way and railroad right of way. Dimensions shall be measured to the top of the conduit.

i. Conduit crossing existing underground utilities shall cross below the bottom depth of the existing utilities. If the top portion of the existing utility depth below finish grade exceeds 72-inches and the specified separation and depths are maintained when crossing over the top of the existing underground utility, the conduit may cross above the existing underground utility.

j. Provide long radius horizontal bends (minimum radius of 36-times the conduit diameter) in underground conduits where the conduit is in excess of 100-feet long.

k. Conduits installed below grade and on grade below buildings, shall not be smaller than 0.75-inches.

l. Underground conduits entering a building shall be sloped. The conduit direction of slope shall be away from the building and shall prevent water in the conduit from "Gravity Draining" towards the building. The conduit slope "high point" shall originate from the building, out to the first exterior pullbox, manhole etc. exterior conduit termination "Low Point". The minimum slope angle shall be a constant 8-inches (or greater) of fall for each 100-feet of conduit length.

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m. Dewatering:
1) Provide pumping to remove, maintain and dispose of all water entering the excavation during the time the excavation is being prepared, for the conduit laying, during the laying of the conduit, and until the backfill at the conduit zone has been completed. These provisions shall apply on a continuous basis. Water shall be disposed of in a manner to prevent damage to adjacent property. Trench water shall not be drained through the construction. Groundwater shall not be allowed to rise around the pipe until joining compound has firmly set.
2) The Owner's Representative shall be notified 48 hours prior to commencement of dewatering.

6. Raceway/Conduits, which are installed at this time and left empty for future use, shall have 0.25-inch diameter polyvinyl rope left in place for future use. The pull rope shall be 500-pound minimum tensile strength. Provide a minimum of 5-feet of slack at each end of pull ropes.

7. Unless otherwise restricted by Structural Drawings and Specifications, the maximum size conduit permitted in walls, ceilings and roofs constructed of masonry or concrete shall not be greater than 25-percent of the concrete/ masonry thickness. Conduits installed in these locations shall not cross.

8. Provide openings in building structures for conduit penetrations:
a. New construction shall be provided with conduit sleeves, to provide conduit penetration.

b. Existing construction shall be drilled (core drill masonry and concrete) and provide conduit sleeves installed after drilling, to provide conduit penetration.
c. Where the structure penetrations for underground conduits penetrating through foundations will not comply with the (restriction/ penetration) shown in the Contract Documents, install the conduits below and clear of the foundation lowest point.

9. Conduit bends risers and offsets:
   a. The minimum bend radius of "Factory or Field" fabricated conduit bends shall not be less than the following. The bend radius shall be measured at the surface, inside radius of the conduit wall:
      1) FMC and LTFMC conduit - conduit minimum bend radius 12-times the conduit diameter.
      2) RMC and EMT conduit minimum bend radius - conduit for power circuits over 100 volts and less than 600 volts, 8-times conduit diameter. Conduit for power circuits over 600 volt, 12-times conduit diameter. Conduit for low voltage, signal and fiber optic circuits, 10-times conduit diameter.
      3) RNMC conduit - conduit minimum bend radius 36-times the conduit diameter. Under building reduce minimum bend radius to 10-times the conduit diameter.
      4) Conduits for Utility Company conductors. Conduit minimum bend radius shall comply with the respective Utility Company Requirements.
   b. Bends and offsets in conduits shall be kept to an absolute minimum. The total summation of all bends and offsets permitted in a conduit segment, occurring between two conduit termination/ connection end points, shall not exceed the following, including conduit fittings:
      1) RMC and EMT conduit - 360 angular degrees
      2) FMC and LTFMC conduit - 180 angular degrees
      3) RNMC conduit - 270 angular degrees
   c. Each field fabricated conduit offset, bend and elbow which are not the standard product of the Raceway/Conduit Manufacturer shall be mandrel tested. The test shall be conducted after the conduit installation is complete and prior to pulling-in any wire, in the same manner as for underground conduits.
   d. Factory manufactured angle connector conduit fittings shall be installed in exposed conduit locations only. Installation in locations normally concealed from view shall not be permitted. Not more than one factory manufactured angle connector shall be permitted in any length of conduit between conduit termination end points.

10. Expansion joint, deflection joint and seismic joint fittings.
    a. Provide a conduit expansion fitting for each conduit length and conduit type as follows (Note - The installation of specified combination expansion/deflection fittings at seismic joints shall satisfy this spacing Requirement also):

	Conduit Type	Conduit	Fitting Length Spacing
1)	RMC and EMT	Exposed exterior locations	200-feet
2)	RMC and EMT	Interior weather protected locations	400-feet

    b. Provide a conduit combination expansion/deflection fitting for each conduit, crossing the following elements:
       1) At each building or non-building structure seismic joint.
       2) At each building on non-building structure expansion joint.
       3) At each conduit penetration of a "Sound-Rated" wall, floor or ceiling.

11. Provide two locknuts and an insulated throat bushing at each metal conduit terminating at enclosures, including but not limited to outlet boxes, junction boxes, terminal cabinets, transformers, switchboards, distribution panels and panelboards.

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12. Provide metallic or plastic closure caps on all conduit ends during construction, until installation of conductors in the respective conduit.
13. Conduit run exposed, shall be run at right angles or parallel to the walls or structures. All changes in direction, either horizontally or vertically, shall be made with conduit outlet bodies as manufactured by Crouse Hinds, OZ or equal. Conduits run on exposed beams or trelliswork shall be painted to match surrounding surfaces.
14. Rigid steel conduit or electrical metallic tubing shall not be strapped or fastened to equipment subject to vibration or mounted on shock absorbing bases.
15. RMC conduit threads:
    a. Machine cut threads on RMC conduit required for field fabrication shall comply with NPS and ANSI-B1.20.1.
    b. The length of bare metal exposed during thread fabrication shall be completely covered by conduit couplings and fittings. Additionally, the thread length shall insure that conduit joints will reach "Torque" tightness and become secure before conduit ends "Butt" together and before conduit ends "Butt" into the "Shoulders" of other conduit fittings.
    c. Running threads or right/left-handed threads shall not be used to connect RMC.
16. RNMC conduit:
    a. Joints and fittings shall be solvent welded to RNMC conduit. Joints and fittings shall be watertight and airtight after fabrication.
17. Tighten each conduit fittings and fitting appurtenance, to the "Torque" (allowable tolerance ±5%) value recommended by the Fitting Manufacturer and applicable Code. If three or more conduit fittings are found to not follow the Manufacturer's "Torque" (tightness) recommendations, the following corrective actions shall occur:
    a. The Contractor shall tighten "Re-Torque" the defective fittings and all similar conduit fittings installed as part of the Contract Documents in the presence of the Owner's Representative.
    b. If the respective conduit fittings similar to the deficient "Torque Tightness" fittings are installed concealed in walls, floors, above ceilings or below grade, the Contractor shall expose the fitting, to allow retightening each similar conduit fitting to the Manufacturers recommended "Torque" values.
    c. All the cost to repair the direct, indirect, incidental damages and Contract delays resulting from complying with these Requirements shall be the sole responsibility of the Contractor and shall be included in the bid price.

H. Conduit Bodies
1. Conduit bodies shall be installed in exposed conduit locations only or above accessible ceilings.
2. Conduit bodies shall be accessible for removing body cover and pulling wire through the conduit body.
3. Conduit bodies shall not be installed inside enclosed walls.

3.4 WIRE AND CABLE

A. Branch Circuit and Fixture Joints for #10 AWG and Smaller Wire shall be made with UL-approved connectors listed for 600 volts, approved for use with copper and/or aluminum wire. Connector to consist of a cone-shaped, expandable coil spring insert, insulated with a nylon shell and two wings placed opposite each other to serve as a built-in wrench or shall be molded one-piece as manufactured by 3M-"Scotchlok".

B. Branch Circuit Joints of #8 AWG and Larger shall be made with screw pressure connectors made of high strength structural aluminum alloy and UL-approved for use with both copper and/or aluminum wire as manufactured by Thomas & Betts. Joints shall be insulated with plastic splicing

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tape, tapered half-lapped and at least the thickness equivalent to 1.5-times the conductor insulation. Tapes shall be fresh and of quality equal to Scotch.

C. Use UL Listed Pulling Compound for Installation of Conductors in Conduits.

D. Correspond each Circuit to the Branch Number Indicated on the Panel Schedule shown on the Drawings except where departures are approved by the Owner's Representative.

E. All Wiring, including low voltage, shall be installed in conduit.

F. Control Wiring to conform to the Wiring Diagrams shown on the Mechanical Drawings and the Manufacturer's wiring diagrams.

G. All Splices in Exterior Pull Boxes and Light Poles shall be cast resins encapsulated.
   1. Power conductor splices - 3M Scotchcast Series 82/85/90; Plymouth or equal.
   2. Control and signal circuits 3M Scotchcast series 8981 thru 8986, Plymouth or equal.

H. Neatly Group and Lace all wiring in panelboards and terminal cabinets with plastic ties at 3-inches on centers. Tag all spare conductors.

3.5 TESTING

A. Testing Conduit and Conduit Bends

The Contractor shall demonstrate the usability of all underground raceways, and field fabricated conduit bends installed as part of this Contract.

1. A round tapered segmented semi-rigid mandrel with a diameter approximately ¼-inch smaller than the diameter of the raceway, shall be pulled through each new raceway.
2. The mandrel shall be pulled through after the raceway installation is completed. Conduits which stubout only, may have the mandrel pulled after the concrete encasement is completed, but prior to completing the backfill.
3. Owner's Representative shall witness the Raceway Testing for usability. A Representative of the respective Utility Company shall witness the Raceway Testing where applicable.
4. Contractor shall repair/replace any conduit and conduit bend provided under this Contract which will not readily pass the mandrel during this Test.

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END OF SECTION 26 05 33
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SECTION 26 09 23 - LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

1.2 REFERENCES

A. Edit the Following to Include Only those Standards Referenced Elsewhere in this Section.
B. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/ IEEE) (and www.ieee.org)
C. Underwriter Laboratories of Canada (ULC)
D. International Electrotechnical Commission (www.iec.ch) (IEC)
E. International Organization for Standardization (ISO) (www.iso.ch):
F. National Electrical Manufacturers Association (NEMA) (www.nema.org)
G. WD1 (R2005) - General Color Requirements for Wiring Devices.
H. Underwriters Laboratories, Inc. (UL) (www.ul.com):
   1. 20 – Plug Load Controls
   2. 508 – Industrial Controls
   3. 916 – Energy Management Equipment.
   4. 924 – Emergency Lighting

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1.3 SYSTEM DESCRIPTION AND OPERATION

A. The Lighting Control and Automation System as defined under this Section covers the following equipment:
   1. Digital Occupancy Sensors – Self-configuring, digitally addressable and calibrated occupancy sensors with LCD display and two-way active infrared (IR) Communications.
   2. Digital Switches – Self-configuring, digitally addressable pushbutton on/off, dimming, and scene switches with two-way active Communications.
   3. Digital Daylighting Sensors – Single-zone closed loop, multi-zone open loop and single-zone dual-loop daylighting sensors with two-way active communications can provide switching, bi-level, tri-level or dimming control for daylight harvesting.
   4. Digital Room Controllers – Self-configuring, digitally addressable one, two or three relay plenum-rated controllers for on/off control. Selected models include 0–10-volt control dimming outputs and integral current monitoring capabilities.
   5. Configuration Tools – Handheld remote for room configuration and relay panel programming provides two-way infrared (IR) communications to digital devices and allows complete configuration and reconfiguration of the device / room from up to 30 feet away. Unit to have Organic LED display, simple pushbutton interface, and allow bi-directional communication of room variables and occupancy sensor settings. Computer software also customizes room settings.
   6. Digital Lighting Management (DLM) local network – Free topology, plug-in wiring system (Cat 5e) for power and data to room devices.

7. Digital Lighting Management (DLM) segment network – Linear topology, BACnet MS/TP network (1.5 twisted pair, shielded,) to connect multiple DLM local networks for centralized control
8. Network Bridge – provides BACnet MS/TP-compliant digital networked communication between rooms, panels and the Segment Manager or Building Automation System (BAS) and automatically creates BACnet objects representative of connected devices.
9. Segment Manager – provides web browser-based user interface for system control, scheduling, power monitoring, room device parameter administration and reporting.
10. Programming and Configuration software – Optional PC-native application capable of accessing DLM control parameters within a room, for the local network, via a USB adapter, or globally, for many segment networks simultaneously, via BACnet/IP communication.
11. LMCP Digital Lighting Management Relay Panel – provides up to 8, 24, or 48 mechanically latching relays. Relays include a manual override and a single push-on connector for easy installation or removal from the panel. Panel accepts program changes from handheld configuration tool for date and time, location, holidays, event scheduling, button binding and group programming. Provides BACnet MS/TP-compliant digital networked communication between other lighting controls and/or building automation system (BAS).
12. Emergency Lighting Control Unit (ELCU) – allows a standard lighting control device to control emergency lighting in conjunction with normal lighting in any area within a building

1.4 LIGHTING CONTROL APPLICATIONS

A. Unless Relevant Provisions of the applicable Local Energy Codes are more stringent, provide a minimum application of lighting controls as follows:

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1. Space Control Requirements – Provide occupancy/vacancy sensors with Manual- or Partial-ON functionality in all spaces except toilet rooms, storerooms, library stacks, or other applications where hands-free operation is desirable and Automatic-ON occupancy sensors are more appropriate. Provide Manual-ON occupancy/vacancy sensors for any enclosed office, conference room, meeting room, open plan system and training room. For spaces with multiple occupants, or where line-of-sight may be obscured, provide ceiling- or corner-mounted sensors and Manual-ON switches.
2. Bi-Level Lighting – Provide multi-level controls in all spaces except toilet rooms, storerooms, library stacks, or applications where variable dimming is used.
3. Task Lighting/Plug Loads – Provide automatic shut off of non-essential plug loads and task lighting in all spaces except toilet rooms and storerooms. Provide Automatic-ON of plug loads whenever spaces are occupied. For spaces with multiple occupants a single shut off consistent with overhead lighting may be used for the area.
4. Daylit Areas – Provide daylight-responsive automatic control in all spaces (conditioned or unconditioned) where daylight contribution is available as defined by relevant Local Building Energy Code:
    a. All luminaires within Code-defined daylight zones shall be controlled separately from luminaires outside of day lit zones.
    b. Daytime set points for total ambient illumination (combined day-light and electric light) levels that initiate dimming shall be programmed in compliance with relevant Local Building Energy Codes.
    c. Multiple-level switched daylight harvesting controls may be utilized for areas marked on Drawings.
    d. Provide smooth and continuous daylight dimming for areas marked on Drawings. Daylighting control system may be designed to turn off electric lighting when

daylight is at or above required lighting levels, only if system functions to turn lamps back on at dimmed level, rather than turning full-on prior to dimming.

1.5 SUBMITTALS

A. Submittals Package: Submit the Shop Drawings, and the product data specified below at the same time as a package.

B. Shop Drawings:

1. Composite wiring and/or schematic diagram of each control circuit as proposed to be installed.
2. Show exact location of all digital devices, including at minimum sensors, room controllers, and switches for each area on Reflected Ceiling Plans (Contractor must provide AutoCAD format Reflected Ceiling Plans).
3. Provide room/area details including products and sequence of operation for each room or area. Illustrate typical acceptable room/area connection topologies.
4. Network riser diagram including floor and building level details. Include Network Cable Specification and end-of-line termination details, if required. Illustrate points of connection to integrated systems. Coordinate integration with Mechanical and/or other trades.

C. Product Data: Catalog Sheets, Specifications and Installation Instructions.

D. Include Data for each device which:

1. Indicates where sensor is proposed to be installed.
2. Prove that the sensor is suitable for the proposed application.

1.6 QUALITY ASSURANCE

Manufacturer: Minimum 10-years' experience in Manufacturer of Lighting Controls.

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1.7 WARRANTY

Provide a 5-year limited Manufacturer's Warranty on all Room Control Devices and Panels.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

Acceptable Manufacturers: Leviton; Douglas; N Light; equal.

2.2 DIGITAL LIGHTING CONTROLS

Provide system that accommodates the Square-Footage Coverage Requirements for each area controlled, utilizing room controllers, digital occupancy sensors, switches, daylighting sensors and accessories which suit the lighting and electrical system parameters.

2.3 DIGITAL WALL SWITCH OCCUPANCY SENSORS

A. Wall Box Mounted Passive Infrared PIR or dual technology (passive infrared and ultrasonic) digital occupancy sensor with 1 or 2 switch buttons.

B. Digital Occupancy Sensors shall provide scrolling LCD display for Digital Calibration and Electronic Documentation. Features include the following:

1. Digital calibration and pushbutton configuration for the following variables:
   a. Sensitivity – 0-100% in 10% increments
   b. Time delay – 1-30 minutes in 1-minute increments
   c. Test mode – Five second time delay
   d. Detection technology – PIR, Dual Technology activation and/or re-activation.
   e. Walk-through mode

f. Load parameters including Auto/Manual-ON, blink warning, and daylight enable/ disable when photo sensors are included in the DLM local network.

2. Programmable control functionality including:
   a. Each sensor may be programmed to control specific loads within a local network.
   b. Sensor shall be capable of activating one of 16 user-definable lighting scenes.
   c. Adjustable retrigger time period for manual-on loads. Load will retrigger (turn on) automatically during the configurable period of time (default 10 seconds) after turning off.
   d. On dual technology sensors, independently configurable trigger modes are available for both Normal (NH) and After Hours (AH) time periods. The retrigger mode can be programmed to use the following technologies:
      1) Ultrasonic and Passive Infrared
      2) Ultrasonic or Passive Infrared
      3) Ultrasonic only
      4) Passive Infrared only
3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
4. Two RJ-45 ports for connection to DLM local network.
5. Two-way infrared (IR) transceiver to allow remote programming through handheld configuration tool and control by remote personal controls.
6. Device Status LEDs including:
   a. PIR detection
   b. Ultrasonic detection
   c. Configuration mode
   d. Load binding
7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
8. Assignment of local buttons to specific loads within the room without wiring or special tools
9. Manual override of controlled loads.
10. All digital parameter data programmed into an individual wall switch sensor shall be retained in non-volatile FLASH memory within the wall switch sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet Object Information shall be available for the following objects:
   1. Detection state
   2. Occupancy sensor time delay
   3. Occupancy sensor sensitivity, PIR and Ultrasonic
   4. Button state
   5. Switch lock control
   6. Switch lock status

D. Units shall not have any dip switches or potentiometers for field settings.

E. Multiple Occupancy Sensors may be Installed in a Room by simply Connecting them to the Free Topology DLM local network. No additional configuration will be required.

F. Two-Button Wall Switch Occupancy Sensors, when connected to a single relay dimming room controller, shall operate in the following sequence as a factory default:
   1. Left button
      a. Press and release - Turn load on
      b. Press and hold - Raise dimming load

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2. Right button
    a. Press and release - Turn load off
    b. Press and hold - Lower dimming load

G. Low Voltage Momentary Pushbuttons shall include the following features:
1. Load/Scene Status LED on each switch button with the following characteristics:
    a. Bi-level LED
    b. Dim locator level indicates power to switch
    c. Bright status level indicates that load or scene is active
2. The following button attributes may be changed or selected using a wireless configuration tool:
    a. Load and Scene button function may be reconfigured for individual buttons (from Load to Scene, and vice versa).
    b. Individual button function may be configured to Toggle, On only or Off only.
    c. Individual scenes may be locked to prevent unauthorized change.
    d. Fade Up and Fade Down times for individual scenes may be adjusted from 0 seconds to 18 hours.
    e. Ramp rate may be adjusted for each dimmer switch.
    f. Switch buttons may be bound to any load on a room controller and are not load type dependent; each button may be bound to multiple loads.

2.4 DIGITAL WALL OR CEILING MOUNTED OCCUPANCY SENSOR

A. Wall or Ceiling Mounted (to suit installation) Passive Infrared (PIR), Ultrasonic or Dual Technology Digital (passive infrared and ultrasonic) Occupancy Sensor.

B. Digital Occupancy Sensors shall provide graphic LCD display for digital calibration and electronic documentation. Features include the following:
1. Digital calibration and pushbutton configuration.
2. Programmable control functionality.
3. Independently configurable sensitivity settings for passive infrared and ultrasonic technologies (on dual technology sensors) for both Normal (NH) and After Hour (AH) time periods.
4. One or two RJ-45 port(s) for connection to DLM local network.
5. Two-way Infrared (IR) transceiver to allow remote programming through handheld commissioning tool and control by remote personal controls.
6. Device Status LEDs, which may be disabled for selected applications, including:
    a. PIR detection
    b. Ultrasonic detection
    c. Configuration mode
    d. Load binding
7. Assignment of occupancy sensor to a specific load within the room without wiring or special tools.
8. Manual override of controlled loads.
9. All digital parameter data programmed into an individual occupancy sensor shall be retained in non-volatile FLASH memory within the sensor itself. Memory shall have an expected life of no less than 10 years.

C. BACnet Object Information shall be available for the following objects:
1. Detection state
2. Occupancy sensor time delay
3. Occupancy sensor sensitivity, PIR and Ultrasonic

D. Units shall not have any dip switches or potentiometers for field settings.

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E. Multiple Occupancy Sensors may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration will be required.

2.5 DIGITAL WALL SWITCHES

A. Low Voltage Momentary Pushbutton Switches in 1, 2, 3, 4, 5 and 8 button configurations. Wall switches shall include the following features:
   1. Two-way infrared (IR) transceiver for use with personal and configuration remote controls.
   2. Removable buttons for field replacement with engraved buttons and/or alternate color buttons. Button replacement may be completed without removing the switch from the wall.
   3. Configuration LED on each switch that blinks to indicate data trans-mission.
   4. On/off/dim control for all lights in room.

B. Teacher's control station shall be wall-mounted touch screen control panel providing on/off/dim control of all room lights with 2 programmable scene presets.

C. Multiple Digital Wall Switches may be installed in a room by simply connecting them to the free topology DLM local network. No additional configuration shall be required to achieve multi-way switching.

2.6 DIGITAL DAYLIGHTING SENSORS

A. Digital Daylighting Sensors shall work with room controllers to provide automatic switching, bi-level, or tri-level or dimming daylight harvesting capabilities for any load type connected to a room controller. Daylighting sensors shall be interchangeable without the need for rewiring.

B. Digital Daylighting Sensors shall include the following features:
   1. The sensor's internal photodiode shall only measure light waves within the visible spectrum. The photodiode's spectral response curve shall closely match the entire photopic curve. The photodiode shall not measure energy in either the ultraviolet or infrared spectrums. The photocell shall have a sensitivity of less than 5% for any wavelengths less than 400 nanometers or greater than 700 nanometers.
   2. Sensor light level range shall be from 1-6,553 footcandles (fc).
   3. The capability of ON/OFF, bi-level or tri-level switching, or dimming, for each controlled zone, depending on the selection of room controller(s) and load binding to room controller(s).
   4. For switching daylight harvesting, the photo sensor shall provide a field-selectable deadband, or a separation, between the "ON Setpoint" and the "OFF Setpoint" that will prevent the lights from cycling excessively after they turn off.
   5. For dimming daylight harvesting, the photo sensor shall provide the option, when the daylight contribution is sufficient, of turning lights off or dimming lights to a field-selectable minimum level.
   6. Photo sensors shall have a digital, independently configurable fade rate for both increasing and decreasing light level in units of percent per second.
   7. Photo sensors shall provide adjustable cut-off time. Cut-off time is defined by the number of selected minutes the load is at the minimum output before the load turns off. Selectable range between 0-240 minutes including option to never cut-off.
   8. Optional wall switch override shall allow occupants to reduce lighting level to increase energy savings or, if permitted by system administrator, raise lighting levels for a selectable period of time or cycle of occupancy.
   9. Integral infrared (IR) transceiver for configuration and/or commissioning with a handheld configuration tool, to transmit detected light level to wireless configuration tool, and for communication with personal remote controls.
   10. Configuration LED status light on device that blinks to indicate data transmission.
   11. Status LED indicates test mode, override mode and load binding.

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12. Recessed switch on device to turn controlled load(s) ON and OFF.
13. BACnet object information shall be available for the following daylighting sensor objects, based on the specific photocell's settings:
    a. Light level
    b. Day and night set points
    c. Off time delay
    d. On and off set points
    e. Up to three zone set points
    f. Operating mode – on/off, bi-level, tri-level or dimming
14. One RJ-45 port for connection to DLM local network.
15. A choice of accessories to accommodate multiple mounting methods and building materials. The photo sensors may be mounted on a ceiling tile, skylight light well, suspended lighting fixture or backbox. Standard tube photo sensors accommodate mounting materials from 0-0.62-inch thickness. Extended tube photo sensors accommodate mounting materials from 0.62-inch-1.25-inch thickness. Mounting brackets are compatible with J boxes and wall mounting. Photo sensor to be mounted on included bracket below skylight well.
16. Any load or group of loads in the room can be assigned to a daylighting zone
17. Each load within a daylighting zone can be individually enabled or disabled for discrete control (load independence).
18. All digital parameter data programmed into a photo sensor shall be retained in non-volatile FLASH memory within the photo sensor itself. Memory shall have an expected life of no less than 10 years.

2.7 DIGITAL CONTROLLERS

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A. Digital Controllers for Lighting Automatically Bind the Room Loads to the Connected Devices in the space without Commissioning or the use of any tools. Room controllers shall be provided to match the Room Lighting and Plug Load Control Requirements. The controllers will be simple to install and will not have dip switches or potentiometers. The control units will include the following features:
    1. Automatic room configuration to the most energy-efficient sequence of operation based upon the devices in the room.
    2. Simple replacement – Using the default automatic configuration capabilities, a room controller may be replaced with an off-the-shelf.
    3. Multiple room controllers connected together in a local network must automatically prioritize each room controller, without requiring any configuration or setup, so that loads are sequentially assigned using room controller device IDs from highest to lowest.
    4. Device Status LEDs to indicate:
        a. Data transmission
        b. Device has power
        c. Status for each load
        d. Configuration status
    5. Quick installation features including:
        a. Standard junction box mounting
        b. Quick low voltage connections using standard RJ-45 patch cable
    6. Based on individual configuration, each load shall be capable of the following behavior on power up following the loss of normal power:
        a. Turn on to 100%
        b. Remain off
        c. Turn on to last level

7. Each load shall be configurable to operate in the following sequences based on occupancy:
   a. Auto-on/Auto-off (Follow on and off)
   b. Manual-on/Auto-off (Follow off only)
8. The polarity of each load output shall be reversible, via digital configuration, so that on is off and off is on.
9. BACnet object information shall be available for the following objects:
   a. Load status
   b. Electrical current
   c. Total watts per controller
   d. Schedule state – normal or after-hours
   e. Demand response control and cap level
   f. Room occupancy status
   g. Total room lighting and plug loads watts
   h. Total room watts/sq ft
   i. Force on/off all loads
10. UL 2043 plenum rated
11. Manual override and LED indication for each load
12. Dual voltage (120/277 VAC, 60Hz), or 347 VAC, 60Hz (selected models only). 120/277-volt models rated for 20A total load, derating to 16A required for some dimmed loads (forward phase dimming); 347-volt models rated for 15A total load; plug load controllers carry application-specific UL 20 rating for receptacle control.
13. Zero cross circuitry for each load
14. All digital parameter data programmed into an individual room controller shall be retained in non-volatile FLASH memory within the controller itself. Memory shall have an expected life of no less than 10 years.

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B. Room Controllers shall include:
   1. Real time current monitoring
   2. Multiple relay configurations
   3. Efficient 250 mA switching power supply
   4. Four RJ-45 DLM local network ports with integral strain relief and dust cover
   5. One dimming output per relay
      a. 0-10V Dimming - Where indicated, one 0–10-volt analog output per relay for control of compatible ballasts and LED drivers. The 0–10-volt output shall automatically open upon loss of power to the Room Controller to assure full light output from the controlled lighting. (LMRC-21x Series)
      b. Each dimming output channel shall have an independently configurable minimum and maximum calibration trim level to set the dimming range to match the true dynamic range of the connected ballast or driver.
      c. Each dimming output channel shall have an independently configurable minimum and maximum trim level to set the dynamic range of the output within the new 0-100% dimming range defined by the minimum and maximum calibration trim.
   6. Each load shall have an independently configurable preset on level for Normal Hours and After-Hours events to allow different dimmed levels to be established at the start of both Normal Hours and After-Hours events.
   7. Fade rates for dimming loads shall be specific to bound switch buttons, and the load shall maintain a default value for any bound buttons that do not specify a unique value.
   8. The following dimming attributes may be changed or selected using a wireless configuration tool:
      a. Establish preset level for each load from 0-100%
      b. Set high and low trim for each load

c. Set lamp burn in time for each load up to 100 hours

9. Override button for each load provides the following functions:
   a. Press and release for on/off control
   b. Press and hold for dimming control

2.8 DLM LOCAL NETWORK (ROOM NETWORK)

A. The DLM Local Network is a Free Topology Lighting Control Physical Connection and Communication Protocol designed to control a small area of a building.

B. Features of the DLM Local Network include:
   1. Plug n' Go® automatic configuration and binding of occupancy sensors, switches and lighting loads to the most energy-efficient sequence of operation based upon the device attached.
   2. Simple replacement of any device in the network with a standard off the shelf unit without requiring commissioning, configuration or setup.
   3. Push n' Learn® configuration to change the automatic configuration, including binding and load parameters without tools, using only the buttons on the digital devices in the local network.
   4. Two-way infrared communications for control by handheld remotes, and configuration by a handheld tool including adjusting load parameters, sensor configuration and binding, within a line of sight of up to 30 feet from a sensor, wall switch or IR receiver.

C. Digital Room Devices Connect to the Local Network using pre-terminated Cat 5e cables with RJ-45 connectors, which provide both data and power to room devices. Systems that utilize RJ-45 patch cords but do not provide serial communication data from individual end devices are not acceptable.

D. If Manufacturer's Pre-Terminated CAT 5e cables are not used for the installation, the Contractor is responsible for testing each cable following Installation and Supplying Manufacturer with test results.

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2.9 DLM SEGMENT NETWORK (ROOM TO ROOM NETWORK)

A. The Segment Network shall be a linear topology, BACnet-based MS/TP subnet to connect DLM local networks (rooms) and LMCP relay panels for centralized control.
   1. Each connected DLM local network shall include a single network bridge (LMBC-300), and the network bridge is the only room-based device that is connected to the segment network.
   2. Network bridges, relay panels and segment managers shall include terminal blocks, with provisions for separate "IN" and "OUT" terminations, for segment network connections.
   3. The segment network shall utilize 1.5 twisted pair, shielded, cable supplied by the Lighting Control Manufacturer. The maximum cable run for each segment is 4,000 feet. Conductor-to-conductor capacitance of the twisted pair shall be less than 30pf/ft and have a characteristic impedance of 120 Ohms.
   4. Network signal integrity requires that each conductor and ground wire be correctly terminated at every connected device.
   5. Substitution of Manufacturer-supplied cable must be pre-approved: Manufacturer will not certify network reliability, and reserves the right to void warranty, if non-approved cable is installed, and if terminations are not completed according to Manufacturer's Specific Requirements.
   6. Segment networks shall be capable of connecting to BACnet-compliant BAS (provided by others) either directly, via MS/TP, or through NB-Routers, via BACnet/IP or BACnet/Ethernet. Systems whose room-connected network infrastructure require gateway devices to provide BACnet data to a BAS are unacceptable.

2.10 CONFIGURATION TOOLS

A. A Wireless Configuration Tool Facilitates Optional Customization of DLM local networks using two-way infrared communications, while PC software connects to each local network via a USB interface.

B. Features and Functionality of the Wireless Configuration Tool shall include but not be limited to:
   1. Two-way infrared (IR) communication with DLM IR-enabled devices within a range of approximately 30 feet.
   2. High visibility organic LED (OLED) display, pushbutton user interface and menu-driven operation.
   3. Must be able to read and modify parameters for room controllers, occupancy sensors, wall switches, daylighting sensors, network bridges and relay panels, and identify room devices by type and serial number.
   4. Save up to eight occupancy sensors setting profiles and apply profiles to selected sensors.
   5. Temporarily adjust light level of any load(s) on the local network and incorporate those levels in scene setting. Set room mode for testing Normal Hours (NH) and After Hours (AH) parameter settings.
   6. Adjust or fine-tune daylighting settings established during auto-configuration, and input light level data to complete configuration of open loop daylighting controls.
   7. Set room mode for testing Normal Hours (NH) and After Hours (AH) parameter settings.
   8. Verify status of building level network devices.

2.11 NETWORK BRIDGE

A. The Network Bridge Module Connects a DLM local network to a BACnet-compliant segment network for communication between rooms, relay panels and a segment manager or BAS. Each local network shall include a network bridge component to provide a connection to the local network room devices. The network bridge shall use Industry Standard BACnet MS/TP network communication and an optically isolated EIA/TIA RS-485 transceiver.

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   1. The network bridge shall be provided as a separate module connected on the local network through an available RJ-45 port.
   2. Provide Plug n' Go operation to automatically discover room devices connected to the local network and make all device parameters visible to the segment manager via the segment network. No commissioning shall be required for set up of the network bridge on the local network.
   3. The network bridge shall automatically create standard BACnet objects for selected room device parameters to allow any BACnet-compliant BAS to include lighting control and power monitoring features as provided by the DLM room devices on each local network. BACnet objects will be created for the addition or replacement of any given in-room DLM device for the installed life of the system. Products requiring that an application-specific point database be loaded to create or map BACnet objects are not acceptable. Systems not capable of providing BACnet data for control devices via a dedicated BACnet Device ID and physical MS/TP termination per room are not acceptable. Standard BACnet objects shall be provided as follows:
      a. Read/write the normal or after-hours schedule state for the room
      b. Read the detection state of each occupancy sensor
      c. Read the aggregate occupancy state of the room
      d. Read/write the On/Off state of loads
      e. Read/write the dimmed light level of loads
      f. Read the button states of switches
      g. Read total current in amps, and total power in watts through the room controller

h. Read/write occupancy sensor time delay, PIR sensitivity and ultrasonic sensitivity settings
i. Activate a preset scene for the room
j. Read/write daylight sensor fade time and day and night set points
k. Read the current light level, in footcandles, from interior and exterior photo-sensors and photocells
l. Set daylight sensor operating mode
m. Read/write wall switch lock status
n. Read watts per square foot for the entire controlled room
o. Write maximum light level per load for demand response mode
p. Read/write activation of demand response mode for the room
q. Activate/restore demand response mode for the room

2.12 SEGMENT MANAGER

A. For Networked Applications, the Digital Lighting Management System shall include at least one Segment Manager to manage network communication. It shall be capable of serving up a graphical user interface via a standard web browser utilizing either unencrypted TCP/IP traffic via a configurable port (default is 80) or 256-bit AES encrypted SSL TCP/IP traffic via a configurable port (default is 443).

B. Each Segment Manager shall have integral support for at least three segment networks. Segment networks may alternately be connected to the Segment Manger via external routers and switches, using Standard Ethernet structured wiring. Each router shall accommodate one segment network. Provide the quantity of routers and switches as shown on the plans.

C. Operational Features of the Segment Manager shall include the following:
1. Connection to PC or LAN via standard Ethernet TCP/IP via Standard Ethernet TCP/IP with the option to use SSL encrypted connections for all traffic.
2. Easy to learn and use graphical user interface, compatible with Internet Explorer 8, or equal browser. Shall not require installation of any lighting control software to an end-user PC.
3. Log in security capable of restricting some users to view-only or other limited operations.
4. Automatic discovery of DLM devices and relay panels on the segment network(s). Commissioning beyond activation of the discovery function shall not be required to provide communication, monitoring or control of all local networks and lighting control panels.
5. After discovery, all rooms and panels shall be presented in a standard navigation tree format. Selecting a device from the tree will allow the device settings and operational parameters to be viewed and changed by the user.
6. Ability to view and modify room device operational parameters. It shall be possible to set device parameters independently for normal hours and after-hours operation including sensor time delays and sensitivities, and load response to sensor including Manual-On or Auto-On.
7. Ability to set up schedules for rooms and panels, view and override current status of panel channels and relays and assign relays to groups. Schedules shall automatically set controlled zones or areas to either a normal hour or after hour mode of operation. Support for a minimum of 100 unique schedules, each with up to four-time events per day. Support for annual schedules, holiday schedules and unique date-bound schedules.
8. Ability to group rooms and loads for common control by schedules, switches or network commands.
9. Ability to monitor connected load current and display power consumption for areas equipped with room controllers incorporating the integral current monitoring feature.

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10. Provide capabilities for integration with a BAS via BACnet protocol. At a minimum, the following points shall be available to the BAS via BACnet IP connection to the segment manager: room occupancy state; room schedule mode; room switch lock control; individual occupancy sensor state; room lighting power; room plug-load power; load ON/OFF state; load dimming level; panel channel schedule state; panel relay state; and Segment Manager Group schedule state control.
11. The Segment Manager shall allow access and control of the overall system database via Native Niagara AX FOX connectivity. Systems that must utilize a Tridium Niagara controller in addition to the programming, scheduling and configuration server are not acceptable.

D. Segment Manager shall Support Multiple DLM Rooms as follows:
1. Support up to 120 network bridges and 900 digital in-room devices (LMSM-3E).
2. Support up to 300 network bridges and 2,200-digital in-room devices, connected via network routers and switches (LMSM-6E).

2.13 PROGRAMMING, CONFIGURATION AND DOCUMENTATION SOFTWARE

PC-Native Application for Optional Programming of Detailed Technician-Level Parameter information for all DLM products, including all parameters not accessible via BACnet and the handled IR configuration tool. Software must be capable of accessing room-level parameter information locally within the room when connected via the optional LMCI-100 USB programming adapter, or globally for many segment networks simultaneously utilizing standard BACnet/IP Communication.

2.14 MAIN LIGHTING CONTROL PANEL

A. Provide Main Lighting Control Panel for common area and exterior lighting as indicated on the Plans and Schedules. Panel shall be of modular construction and consist of the following components:
1. Enclosure/Tub shall be NEMA 1, sized to accept an interior with 1 - 8 relays, 1 - 24 relays and six 4-pole contactors, or 1 - 48 relays and six 4-pole contactors.
2. Cover shall be configured for surface or flush wall mounting of the panel as indicated on the plans. The panel cover shall have a hinged and lockable door with restricted access to line voltage section of the panel.
3. Interior assembly shall be supplied as a factory assembled component specifically designed and listed for field installation. The interior construction shall provide total isolation of high voltage (Class 1) wiring from low voltage (Class 2) wiring within the assembled panel. The interior assembly shall include intelligence boards, power supply, DIN rails for mounting optional Class 2 control devices, and individually replaceable latching type relays.

   The panel interiors shall include the following features:
   a. Removable plug-in terminal blocks with connections for all low voltage terminations.
   b. Individual terminal block, override pushbutton, and LED status light for each relay.
   c. Direct wired switch inputs associated with each relay shall support 2-wire momentary switches only.
   d. Digital inputs (four RJ-45 jacks) shall support 1-, 2-, 3-, 4-, and 8-button digital switches; digital IO modules capable of receiving 0-5V or 0-10V analog photocell inputs; digital IO modules capable of receiving momentary or maintained contact closure inputs or analog sensor inputs; digital daylighting sensors; and digital occupancy sensors. Inputs are divided into two separate digital networks, each capable of supplying 250mA to connected devices.

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e. True relay state shall be indicated by the on-board LED and shall be available to external control devices and systems via BACnet.
f. Automatically sequenced operation of relays to reduce impact on the electrical distribution system when large loads are controlled simultaneously.
g. Group and pattern control of relays shall be provided through a simple keypad interface from a handheld IR programmer. Any set of relays can be associated with a group for direct on/off control or pattern (scene) control via a simple programming sequence using the relay override pushbuttons and LED displays for groups 1-8 or a handheld IR programmer for groups 1-99.
h. Relay group status for shall be provided through LED indicators for groups 1-8 and via BACnet for groups 1-99. A solid LED indicates that the last group action called for an ON state and relays in the group are on or in a mixed state.
i. Single-pole latching relays with modular plug-in design. Relays shall provide the following ratings and features:
    1) Electrical:
        a) 20amp tungsten and LED driver at 120V
        b) 1.5 HP motor at 120V
        c) 10,000-amp Short Circuit Current Rating (SCCR) at 120V
    2) Mechanical:
        a) Replaceable, ½-inch KO mounting with removable Class 2 wire harness.
        b) Actuator on relay housing provides manual override and visual status indication, accessible from Class 2 section of panel.
        c) Dual line and load terminals each support two #14 - #12 solid or stranded conductors.
        d) Tested 300,000 mechanical on/off cycles.

4. Isolated low voltage contacts provide true relay status feedback and pilot light indication.
5. Power supply shall be a multi-voltage transformer assembly with rated power to supply all electronics, occupancy sensors, switches, pilot lights, and photocells as necessary to meet the Project Requirements. Power supply to have internal over-current protection with automatic reset and metal oxide visitor protection.
6. Lighting control panels shall be designated for control of emergency lighting shall be provided with factory installed provision for automatic bypass of relays controlling emergency circuits upon loss of normal power. Panels shall be properly listed and labeled for use on emergency lighting circuits and shall meet the Requirements of UL924 and NFPA 70 - Article 700.
7. Integral system clock shall provide scheduling capabilities.
    a. Panel shall include digital clock capability able to issue system wide automation commands to up to eleven other panels for a total of twelve networked lighting control panels. The clock shall provide capability for up to 254 independent schedule events per panel for each of the 99-system wide channel groups.
    b. The clock capability of each panel shall support the time-based energy saving Requirements of applicable Local Energy Codes.
    c. The clock module shall provide astronomic capabilities, time delays, blink warning, daylight savings, and holiday functions and will include a battery backup for the clock function and program retention in non-volatile FLASH memory. Clocks that require multiple events to meet Local Code Lighting Shut Off Requirements shall not be allowed.

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d. The clock capability of each panel shall operate on a basis of ON/OFF or Normal Hours/After Hours messages to automation groups that implement pre-configured control scenarios. Scenarios shall include:
e. Scheduled ON / OFF
f. Manual ON / Scheduled OFF
g. Astro ON / OFF (or Photo ON / OFF)
h. Astro and Schedule ON / OFF (or Photo and Schedule ON / OFF)
i. The user interface shall be a portable IR handheld remote control capable of programming any panel in the system (LMCT-100)
j. The clock capability of each panel shall employ non-volatile memory and shall retain user programming and time for a minimum of 10 years.
k. Schedules programmed into the clock of any one panel shall be capable of executing panel local schedule or Dark/Light (photocell or Astro) events for that panel in the event that global network communication is lost. Lighting control panels that are not capable of executing events independently of the global network shall not be acceptable.

8. The lighting control panel can operate as a stand-alone system, or can support schedule, group, and photocell control functions, as configured in a Segment Manager Controller, via a segment network connection.
9. The lighting control panel shall support digital communications to facilitate the extension of control to include interoperation with building automation systems and other intelligent field devices. Digital communications shall be RS485 MS/TP-based using the BACnet® protocol.
   a. The panel shall have provision for an individual BACnet device ID and shall support the full 2^{22} range (0 – 4,193,304). The device ID description property shall be writable via the network to allow unique identification of the lighting control panel on the network.
   b. The panel shall support MS/TP MAC addresses in the range of 0 – 127 and baud rates of 9600k, 38400k, 76800k, and 115.2k bits per second.
   c. Lighting control relays shall be controllable as binary output objects in the instance range of 1 – 64. The state of each relay shall be readable and writable by the BAS via the object present value property.
   d. Lighting control relays shall report their true on/off state as binary input objects in the instance range of 1 – 64.
   e. The 99 group Normal Hours/After Hours control objects associated with the panel shall be represented by binary value objects in the instance range of 201 – 299. The occupancy state of each channel group shall be readable and writable by the BAS via the object present value property. Commanding 1 to a channel group will put all relays associated with the channel into the normal hour's mode. Commanding 0 or NULL shall put the relays into the after-hour's mode.
   f. Setup and Commissioning of the panel shall not require Manufacturer-specific software or a computer. All configuration of the lighting control panel shall be performed using standard BACnet objects or via the handheld IR programming remote. Provide BACnet objects for panel setup and control as follows:
      1) Binary output objects in the instance range of 1 – 64 (one per relay) for on/off control of relays.
      2) Binary value objects in the instance range of 1 – 99 (one per channel) for normal hours/afterhours schedule control.
      3) Binary input objects in the instance range of 1 – 64 (one per relay) for reading true on/off state of the relays.

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4) Analog value objects in the instance range of 101 – 199 (one per channel group) shall assign a blink warn time value to each channel. A value of 5 shall activate the blink warning feature for the channel and set a 5-minute grace-time period. A value of 250 shall activate the sweep feature for the channel and enable the use of sweep type automatic wall switches.

g. The description property for all objects shall be writable via the network and shall be saved in non-volatile memory within the panel.

h. The BO and BV 1 – 99 objects shall support BACnet priority array with a relinquish default of off and after hours respectively. Prioritized writes to the channel BV objects shall propagate prioritized control to each member relay in a way analogous to the BACnet Channel object described in Addendum AA. (http://www.bacnet.org/Addenda/Add-135-2010aa.pdf)

i. Panel-aggregate control of relay Force Off at Priority 2 shall be available via a single BV5 object. Force On at Priority 1 shall be available via a single BV4 object.

j. Lockout of all digital switch buttons connected to a given panel shall be command-able via a single BV2 object. The lock status of any connected switch station shall be represented as BV101-196.

B. User Interface

Each lighting control panel system shall be supplied with at least one handheld configuration tool. As a remote programming interface, the configuration tool shall allow setup, configuration, and diagnostics of the panel without the need for software or connection of a computer. The user interface shall have the following panel-specific functions as a minimum:

1. Set network parameters including panel device ID, MS/TP MAC address, baud rate and max master range.
2. Relay Group creation of up to 99 groups. Group creation shall result in programming of all seven key relay parameters for member relays. The seven parameters are as follows: After-hours Override Time Delay, Normal Hours Override Time Delay, Action on Transition to Normal Hours, Action on Transition to After Hours, Sensor Action during Normal Hours, Sensor Action during after Hours, Blink-Warn Time for After Hours.
3. Program up to 254 separate scheduled events. Events shall occur on 7-day intervals with each day selectable as active or inactive and shall be configurable as to whether the event is active on holidays. Holidays are also defined through the User Interface.
4. Program up to 32 separate Dark/Light events. Events shall have a selectable source as either calculated Astro with delay, or a digital IO module with an integral 0-5V or 0-10V analog photocell. Dark/Light events shall occur on 7-day intervals with each day selectable as active or inactive and shall be configurable as to whether the event is active on holidays.
5. Button binding of digital switches to groups shall be accessible via the handheld IR remote and accomplished from the digital switch station.
6. Programming of panel location information shall be accomplished by the handheld IR remote and include at a minimum LAT, LON, DST zone, and an approximate city/state location.
7. An additional handheld IR remote may optionally be specified to be permanently mounted to the panel interior via a retractable anti-theft lanyard to allow for convenient programming of the panel while assuring that the handheld programmer is always present at that panel. An unlimited number of handheld IR remotes may also be purchased for facilities staff as determined by the end User's Representative.

2.15 EMERGENCY LIGHTING CONTROL DEVICES

A. Emergency Lighting Control Unit – A UL 924 listed device that monitors a switched circuit providing normal lighting to an area. The unit provides normal ON/OFF control of emergency

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lighting along with the normal lighting. Upon normal power failure the emergency lighting circuit will close, forcing the emergency lighting ON until normal power is restored. Features include:

1. 120/277 volts, 50/60 Hz, 20-amp ballast rating
2. Push to test button
3. Auxiliary contact for remote test or fire alarm system interface

PART 3 - EXECUTION

3.1 PRE-INSTALLATION MEETING

A. A Factory Authorized Manufacturer's Representative shall provide the Electrical Contractor with a functional overview of the lighting control system prior to installation. The Contractor shall schedule the pre-installation site visit after receipt of approved submittals to review the following:
   1. Confirm the location and mounting of all digital devices, with special attention to placement of occupancy and daylighting sensors.
   2. Review the Specifications for low voltage control wiring and termination.
   3. Discuss the functionality and configuration of all products, including sequences of operation, per Design Requirements.
   4. Discuss Requirements for integration with other trades.

3.2 CONTRACTOR INSTALLATION AND SERVICES

A. Contractor to Install all Devices and Wiring in a Professional Manner. All line voltage connections to be tagged to indicate circuit and switched legs.

B. Contractor to install all Room/Area Devices using Manufacturer's Factory-Tested CAT 6a cable with pre-terminated RJ-45 connectors. If pre-terminated cable is not used for room/ area wiring, the Contractor is responsible for Testing each field-terminated cable following installation and shall supply the Lighting Controls Manufacturer with Test results. Contractor to install any room-to-room network devices using Manufacturer-supplied LM-MSTP network wire. Network wire substitution is not permitted and may result in loss of product warranty per DLM SEGMENT NETWORK Section of Specification. Low voltage wiring topology must comply with Manufacturer's Specifications.

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C. Install the Work of this Section in accordance with Manufacturer's Printed Instructions unless otherwise indicated. Before start-up, Contractor shall Test all devices to ensure proper communication.

D. Calibrate all Sensor Time Delays and Sensitivity to Guarantee Proper Detection of Occupants and Energy Savings.
   1. Adjust time delay so that controlled area remains lighted while occupied.

E. Provide Written or Computer-Generated Documentation on the Configuration of the System including room by room description including:
   1. Sensor parameters, time delays, sensitivities, and daylighting set points.
   2. Sequence of operation, (e.g., manual ON, Auto OFF. etc.)
   3. Load Parameters (e.g., blink warning, etc.)

F. Post Start-up Tuning – After 30 days from Occupancy Contractor shall adjust sensor time delays and sensitivities to meet the Owner's Requirements. Provide a Detailed Report to the Architect / Owner of post start-up activity.

3.3 FACTORY SERVICES

A. Upon Completion of the Installation, the Manufacturer's Factory Authorized Representative shall start up and verify a complete fully functional system.

B. The Electrical Contractor shall provide both the Manufacturer and the Electrical Engineer with 3-weeks written notice of the system start up and adjustment date.

C. Upon Completion of the System Start Up, the Factory-Authorized Technician shall provide the proper training to the Owner's Personnel on the adjustment and maintenance of the system.

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SECTION 26 24 13 - SWITCHBOARDS

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Provide nameplate engraving schedule.
B. Submit time/current trip curves on log/log paper for all fuses, circuit breakers, ground fault system devices, and relays.
D. Short Circuit, Coordination and Arc-Flash.
   1. Perform and submit engineered settings for each equipment location, fuse and circuit breaker device, showing the correct time and current settings to provide the selective coordination within the limits of the specified equipment, per the latest applicable Standards of IEEE and ANSI. Provide electrical system short circuit fault analysis, both 3-phase line-to-line and 1-phase line-to-ground calculations as part of the Coordination Analysis recommendations. Provide Electric Arc-Flash calculations as part of the Coordination Analysis recommendations. Obtain the necessary information to complete the calculations from the serving Electrical Utility Company.
   2. The information shall be submitted in tabular form with an engineering narrative. Written narrative describing data, assumptions, analysis of results and prioritized recommendations, six copies.
   3. The goal is to minimize an unexpected but necessary electrical system outage and Personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment, shall comply with, but not limited to:
      a. IEEE-242, Recommended Practices for Protection and Coordination of Industrial and Commercial Distribution.
      b. IEEE-399, Recommended Practice for Industrial and Commercial Power System Analysis.
      c. IEEE-1584, Guide for Performing Arc-Flash Hazard Calculations.
      d. CEC/NEC
   4. Electrical equipment including switchgear, switchboards, electric panels and control panels, motor control centers, combination motor starters, transformers, disconnects, etc., shall each be labeled by the Manufacturer with “Electric-Arc-Flash” warning signs. The signs shall explain that a hazard to Personnel may exist if the equipment is worked on while energized or operated by Personnel while energized. The sign shall instruct Personnel to wear the correct Protective Equipment/clothing (PPE) when working “Live” or operating “Live” electrical equipment and circuits.
E. Factory Tests: Equipment Tests - ANSI C37.20. Certified copies of Design Tests, Production Tests, and Conformance Tests of the equipment shall be submitted, and review comments shall be received before delivery of equipment to the Project Site. In lieu of the above tests, a report of these tests previously performed on identical units of each rating will be acceptable.

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1.3 APPLICABLE STANDARDS

A. The Switchboard and switchgear Equipment shall be Designed, Tested and Assembled to comply with ANSI, IEEE, and NEMA and UL.

B. Seismic Earthquake and Wind Loading Withstand, Testing and Certification (Additional Requirements).

1. The complete switchboard/switchgear assembly; including circuit protection devices, meter, housing/enclosures, accessories, supports/anchors etc., shall be designed, manufactured and tested.
   a. Wind loading all outdoor equipment locations.
   b. Earthquake Seismic Requirements of CBC/IBC Seismic withstand all indoor and all outdoor equipment locations.
2. Shall withstand, survive and maintain continuous non-interrupted energized operation during seismic event occurrences and wind event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.
3. Shall include demonstrations of successful operation and run test after completion of seismic event shake-table simulation. Acceptance test seismic qualification of proposed switchboard and/or switchgear shall employ triple axis shake-table simulation of the Required Response Spectrum (RRS) seismic event motion, certified and approved by the AHJ.
4. Provide three-dimensional finite element analysis demonstrating anchorage and operational withstand of wind loading not less than as follows and as required by AHJ:
   a. 110MPH-West Coast USA and Hawaii, per ASCE/SEI 7-16.
5. Seismic Test shall be performed by a third-party independent Test Laboratory. Wind Analysis and Seismic Testing and Reports shall be certified, signed and "Stamped" by PE Professional Engineer licensed and in good standing in the State, Civil Engineer or Structural Engineer.

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C. Equipment Components/Devices, Switchboards, and/or Switchgear shall be manufactured by: General Electric; or Eaton; or Square–D; or Siemens.

PART 2 - PRODUCTS

2.1 BUSSING

A. Horizontal and vertical buses shall be full lengths in each Equipment Section. Buses shall have a minimum short circuit fault withstand rating equal to available fault current indicated on Drawings.

B. Provide interconnected full capacity neutral bus in each section with the same ratings and construction as the phase buses.

C. Provide interconnected ground bus in each Section.

D. Provide space and all hardware and mounting attachments for future devices as indicated on the Drawings.

E. Main horizontal phase and neutral bussing shall be full capacity in all equipment sections. The through bus of the end Distribution Section shall be extended and pre-drilled to allow the addition of future Sections.

F. Vertical riser buss may be tapered, to not less than one third the ampacity rating of the main horizontal buss; but in no case shall the vertical buss be of less capacity than the sum of the frame size ampacities of overcurrent devices mounted in the respective Sections including any indicated spares and spaces.

G. The equipment bussing shall be of sufficient cross-sectional area to meet UL Standard 891 on temperature rise Bus shall be copper with silver-plated bus joints or extruded aluminum with tin

plated bus joints. The through bus shall have provisions for the addition of future sections. The through-bus supports, connections and joints are to be bolted with grade 5-hex head bolts and Belleville washers to minimize Maintenance Requirements.

2.2 CIRCUIT BREAKERS

A. General

1. Circuit protective devices as indicated on the Drawings. All devices shall have a short circuit interrupting capacity of not less than the maximum available fault current at the circuit breaker and as indicated on the Drawings.
2. Provide padlock-off devices on each device. Breakers shall provide automatic time over-current and instantaneous circuit protection. Shall be suitable for use as “Main” service disconnect, “Feeder” and “Branch-Circuit” functions.
3. Circuit breakers shall employ a self-powered stored energy, quick make-quick break, and trip free operating system on each phase, with common trip. Circuit breakers shall not trip in the event of short term or long-term electrical power failure. Dead front covers accessible close-open controls, monitors and visual indicator flags.
4. Circuit breakers noted as "100%" on the Drawings shall be tested and rated to carry the breaker full rated (100%) ampere load continuously including the assemblies the circuit breakers are installed into.
5. Provide conductor lugs for circuit protection devices to accept conductor temperature rating, sizes and quantities shown on Drawings. Circuit protection devices shall be UL-listed suitable for normal and reverse feed.
6. Plug-in communications port for circuit breaker portable test instrument connects.
7. Circuit breakers shall be Molded Case Circuit Breaker type. Time/current and instantaneous characteristics and selection of circuit breaker type shall comply with the recommendations in the Coordination Study and Insure Optimal Code mandated time/ current and instantaneous coordinated sequential tripping throughout the electrical system. The Contract Document intent requires providing the selection and use of the circuit breaker types and performance characteristics for time/current and instantaneous trip coordination during electrical circuit overload conditions and during electrical short circuit fault conditions. Combined with the specified circuit breaker protection time/ current performance characteristics.
   a. Molded Case Circuit Breaker type-MCCB:
      1) NEMA-AB1 and AB3 comply with latest revision.
      2) UL-1087, UL-489 and IEC-60.947.2 rated devices, comply with latest revision.
      3) 5Hz AC closing and 3Hz AC trip and clear.
      4) Sealed enclosed housing.

B. Protection Performance Requirements for main circuit breaker:

1. Circuit breaker shall employ current sensors and solid-state static digital electronic automatic trip system. Three phase or single-phase operation as noted on the Drawings. Current carrying components shall be completely isolated from the static trip units. The trip unit shall be independent of external power sources. Circuit breakers shall be rated for reverse connection.
2. Circuit breaker solid state digital trip control functions shall provide the following time/ current curve shaping field adjustable features.
   a. Adjustable ampere setting to vary the long-time continuous current carrying capacity, minimum range of 80% through 100% of full load trip rating.

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b. Adjustable long-time delay setting to vary the time the breaker will trip under sustained overload conditions. Minimum of three settings, "minimum – intermediate - maximum".
c. Adjustable short-time pickup to vary the level of high current the breaker can carry for short periods of time, minimum range of 2-times through 8-times of ampere setting.
d. Adjustable short time delay to vary the time of the short-time pickup. Minimum of three settings "minimum-intermediate-maximum".
e. Short time "I^2t" switch to allow a current-squared multiplied by time ramp function in the short-time system. Two positions setting "in-out".
f. Adjustable instantaneous pickup to vary the breaker ampere setting for immediate (instantaneous) interruption of severe overloads (short circuits). Adjustable minimum range of 2-times through 9-times of circuit breaker ampere sensor rating. Instantaneous selective override trip setting shall also include “on-off” function. When “off”: or “override” is selected, shall then function with the adjustable short time delay and adjustable short time pick-up (Note where the coordination study requires a higher instantaneous setting, change the specified adjustable instantaneous trip to fixed instantaneous trip at 15-times the breaker ampere sensor setting also with on-off function).
g. Individual fault trip indicators (flags) shall provide local indication on the breaker for overload and short circuit conditions.

2.3 GENERAL CONSTRUCTION

A. Switchboard shall be floor mounted, dead-front, dead-rear type, front and rear aligned, self-supporting, consisting of several vertical sections with bussing, utility company instrumentation, and cable termination facilities. Switchboard shall comply with UL Standard #UL-891 and NEMA-PB2.

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B. Switchboard shall include but not be limited to the following:
1. Main disconnect device.
2. Section and termination facilities for utility company supply conductors.
3. Bussing and termination facilities for load side feeder.
4. Termination facilities for future photovoltaic power system on line side of main breaker.

C. Switchboard Sections
1. Floor standing, self-supporting, of the universal frame type using die-formed, 12-gauge steel members bolted and welded together.
2. Provide removable side and rear plates with formed edges all around.
3. Provide ventilation openings required for maintaining nominal operating temperature.
4. Provide removable steel cover plates for all usable device spaces. Provide lifting means and provisions for moving by means of rollers or skids to installation location.
5. Bolt individual Sections together to form a single rigid switchboard assembly.
6. Provide full height, hinged, vertical wireway metal covers, on each vertical wireway, of each Distribution Section of the switchboard.

2.4 CONTROL WIRING

A. Terminal blocks with barriered terminals for each connection shall be provided for all control wiring terminator points. Control wiring shall be run in horizontal and vertical, isolated, internal metal wireways and shall be carried across hinges in laced bundles. Wire terminators shall be crimp-on type spade terminal.

B. Secondary control wiring shall be a minimum of 14 AWG Stranded copper type SIS 600-volt insulation.

C. Control circuits shall have circuit number tags at each termination or break in the wire to match circuit numbers on terminal strips and control wiring diagrams.

PART 3 - EXECUTION

3.1 GENERAL

A. Install equipment in accordance with Manufacturer's written instructions and applicable portions of NECA's "Standards of Installations" for switchboards, switchgear and motor control centers.

B. Prior to Energizing and Testing, Manufacturer's Field Engineer shall visually inspect and verify devices that are operational, and bus connects complete.

3.2 ANCHORING

A. Bolt equipment to concrete pad.

B. Equipment anchoring shall be designed for compliance with the earthquake seismic vertical and lateral acceleration of the equipment installation location.

3.3 FIELD TESTING INSPECTIONS AND COMMISSIONING (ADDITIONAL REQUIREMENTS)

A. Test all equipment after the installation has been completed, and the Owner's Representative has been given 10-days' notice of the proposed tests. The Contractor shall provide operating tests demonstrating that all equipment and devices operate in accordance with the Requirements of the documents.

B. Adjustable Settings

1. Shall be set and tested after the equipment installation is complete, for proper operation at set points, pickup, and/or drop-out points. Shall be performed by an independent Test Laboratory and Trained Certified Technicians actively engaged in testing and using test instruments designed and manufactured for the purpose.
2. Provide protection device settings and test, to ensure operation and coordination as described in the time/current coordination final submittal, and in accordance with the Contract Documents.
3. Calibrate and testing shall comply with the Equipment Manufacturer recommendations.
4. Correct deficiencies, non-compliant equipment and retest to demonstrate compliance.
5. Submit reports to Owner's Representative, six copies.

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SECTION 26 24 15 - PANELBOARDS AND TERMINAL CABINETS

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Provide Manufacturers Catalog Data for Panels, Cabinets, and Circuit Breakers.
B. Provide Shop Drawing showing Panel Circuit Arrangements, size, voltage, ampacity, overcurrent protective devices, etc.
C. Provide Nameplate Engraving Schedule.
D. Short Circuit, Coordination and Arc-Flash
   1. Perform and submit engineered settings for each equipment location, fuse, and adjustable circuit breaker device, showing the correct time and settings to provide the selective coordination within the limits of the specified equipment, per the latest applicable Standards of IEEE and ANSI. Provide electrical system short circuit fault analysis, both 3-phase line-to-line and 1-phase line-to-ground calculations as part of the Coordination Analysis recommendations. Provide Electric Arc-Flash calculations as part of the Coordination Analysis recommendations.
   2. The information shall be submitted in both tabular form and on time current log-log graph paper, with an Engineering Narrative. Written narrative describing data, assumptions, analysis of results and prioritized recommendations, six copies.
   3. The goal is to minimize an unexpected but necessary electrical system outage and personnel exposure to the smallest extent possible within the fault occurrence location, using the specified Contract Equipment. Shall comply with, but not limited to:
      a. IEEE-242, Recommended Practices for Protection and Coordination of Industrial and Commercial Distribution.
      b. IEEE-399, Recommended Practice for Industrial and Commercial Power System Analysis.
      c. IEEE-1584, Guide to Performing Arc-Flash Hazard Study.
      d. CEC/NEC
   4. Electrical equipment including switchgear, switchboards, electrical panels, and control panels, transformers, disconnects, etc., shall each be labeled by the Manufacturer with "Electrical-ARC-Flash" warning signs. The signs shall explain a hazard to personnel that may exist if the equipment is worked on while energized or operated by personnel, to wear the correct Protective Equipment/clothing (PPE) when working "Live" or operating "Live" equipment and circuits.

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1.3 SEISMIC EARTHQUAKE AND WIND LOADING WITHSTAND, TESTING AND CERTIFICATION (ADDITIONAL REQUIREMENTS)

A. General

1. The complete panels and terminal cabinet's assemblies; including circuit protection devices, meter, housings/enclosures, accessories, supports/ anchors etc., shall be designed, manufactured, and tested.
   a. Wind loading all outdoor equipment locations.
   b. Earthquake Seismic Requirements of the CBC/IBC Seismic withstand all indoor and all outdoor equipment locations.
2. Shall withstand, survive, and maintain continuous non-interrupted energized operation during seismic event occurrences and wind event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.

PART 2 - PRODUCTS

2.1 PANELBOARDS AND DISTRIBUTION PANELS

A. Shall be flush or surface mounting as indicated with group-mount circuit protection devices as shown on panel schedule, hinged lockable doors, index cardholders, and proper bussing.

1. Panelboards shall comply with the latest versions:
   a. NEMA – PB1.
   b. UL – 50 and 67.
   c. CEC/NEC.
   d. ASTM-B187.
2. Where indicated on the Drawings shall be furnished with sub-feed breakers and/or additional conductor lugs, split bussing, contactors, time switches, relays, etc., as required.
   a. Branch circuit panels up through 54-circuits shall be single sections, to accommodate all the circuits and components.
   b. Distribution panels shall be single sections or multi-sections, to accommodate all the circuits and components.

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B. Housing and Painting, Panels and Terminal Cabinets

1. Shall be finished with one coat of rust inhibitor zinc chromate and coat of primer sealer after a thorough cleaning.
2. Finish color paint as selected by Owner's Representative where exposed to public view (e.g., corridors, covered passages, offices, etc.). Prime coated panelboard shall be painted to match surroundings after installation in public areas.
3. Manufacturer's standard color in electrical rooms/closets, janitors, HVAC, and storage rooms.
4. Shall be fabricated of sheet steel of the following minimum gauges.
   a. Full height hinged, locking door. Trim #12-gauge steel; enclosure - Code gauge steel.
   b. Panels installed in indoor dedicated electrical equipment rooms and dedicated electrical equipment closets provide panel doors without locks.
5. NEMA-1 Metal Housing, for indoor locations.
6. Fasten the trim to panel and terminal cabinets by means of concealed, bolted or screwed fasteners accessible only when the door is open.

C. Panels 208/120 volt, three phase, 4 wire, S/N or 120/240-volt, single phase, 3-wire, S/N.
Branch circuit panel as manufactured by:

1. Cutler Hammer "Pow-R-Line 1 or 2" Series
2. General Electric "A" Series

3. Siemens "P1/P2" Series
4. Equal by Square D.

D. Distribution Panels as manufactured by:
1. Cutler Hammer "Power-R-Line 3 or 4" Series
2. General Electric "Spectra" Series
3. Siemens "P4/P5" Series
4. Equal by Square D.

E. Top and Bottom Gutter Space shall not be less than 6-inches high. Provide 6-inches additional gutter space in all panels where double lugs are required, or where cable ampere size exceeds bus ampere size.

F. Panel Dimensions.
1. Panels with bus sizes 100 amp thru 400 amp
a. Shall be 20-inches wide. Surface or flush mounting as indicated.
b. Recess mounted type shall have a 20-inches wide (maximum) recess metal enclosure with overlapping edge trim plate cover extending 1-inch on all sides of enclosure.
c. Depth shall be 5.75-inches nominal. Height of panel as required for devices.
2. Panels with 800-amp bus size:
a. 36 to 44-inches (maximum) wide by 8-inches to 15-inches (maximum) deep units. Nominal 90-inch panel height.
b. Distribution panels shall be floor standing and supported from behind the panels at walls.

G. Panels shall have a circuit index cardholder removable type, with clear plastic cover. Index card shall have circuit numbers imprinted to match circuit breaker numbers.
1. The panel identification nameplate shall describe the respective panel name and voltage, corresponding to the contract documents.
2. The electrical power source, name, and location of each panel supply-feeder and supply equipment name shall also be identified and described on the respective panel nameplate.

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H. SPD - Surge Suppression Device
1. Provide each distribution panel with an integral SPD device equal to Siemens TPS3 series for UL Type 2 protection, 100kA per phase.
2. The SPD shall be direct bus connected inside the respective panel housing and shall be factory connected to each main phase, ground, and neutral bus inside the panel; alternatively, the SPD can be mounted external to the panel.

I. Seismic Earthquake and Wind Loading Withstand, Testing and Certification (Additional Requirements)
1. The complete panel/panelboard assembly; including circuit protection devices, housing/ enclosures, accessories, supports/anchors etc., shall be designed, manufactured and tested for wind loading and earthquake seismic install location withstand.
2. Shall withstand, survive, and maintain continuous non-interrupted energized operation (running) during the seismic event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.
3. Shall include demonstrations of successful operation and run test after completion of seismic event shake-table simulation.

2.2 SHORT CIRCUIT RATING

A. Circuit Protective Devices and Bussing as indicated on the Drawings. All devices and bussing shall have a short circuit fault withstand and interrupting capacity not less than the maximum available fault current at the panel and as indicated on the Drawings. However, in no case shall the short circuit fault interrupting and withstand capacity be less than the following symmetrical short circuit.

B. Panel Short Circuit Fault Rating
1. General
a. Provide a "Fully Rated" for short circuit fault interrupt and full load ampere main circuit breaker in each branch circuit panel and/or each distribution panel. Provide the main circuit breaker whether or not a main circuit breaker is shown otherwise on the Drawings, Schedules or Diagrams. The "Utility-Source" plus the "Motor-Load" transient contributions shall be used to establish the available fault duty values, unless indicated otherwise on the Drawings.
b. The panel main circuit breaker full load ampere capacity rating shall equal the respective panel main bus ampere rating.
c. The panel assembly, buss and circuit protection devices bolted fault short circuit withstand and bolted fault short circuit interrupt ratings shall not be less than 125% greater (including a 25% safety margin) than the available utility-source symmetrical and asymmetrical bolted fault short circuit current when "Series Combined Rated" with the panel main circuit breaker.
d. The main circuit breaker rated "Bolted-Fault" short circuit fault interrupt and withstand short circuit rating shall not be less than 125% (including a 25% safety margin) of the upstream main service entrance "Bolted-Fault" available (symmetrical and asymmetrical) short circuit current.
2. Distribution Panelboards
a. Distribution panel, main circuit breaker, all feeder circuit breakers, and all branch circuit breakers shall be "Fully-Rated" (plus safety margin) for the available bolted fault short circuit current (including safety margin).
b. Shall provide time/current-tripping coordination with downstream equipment and upstream equipment.
3. Panelboards 400-amp buss and smaller: branch circuit panelboards 400-amp trip main circuit breaker and smaller.
a. The branch circuit panel main circuit breaker shall be "Fully-Rated" (plus safety margin).
b. The branch circuit panel main circuit breaker shall be "Series-Rated" with the panel downstream branch circuit devices and panel bussing. The "Series-Rating" shall provide short circuit bolted fault current withstand protection and short circuit bolted fault interrupt rating protection during a downstream 3-phase line-to-line and/or single-phase line-to-ground short circuit bolted faults.

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2.3 PANEL CIRCUIT BREAKERS, CIRCUIT PROTECTION DEVICES
A. Circuit Breakers General, for Distribution Panels and Panelboards
1. NEMA-AB1 and AB3, comply with latest revision.
2. UL-1087, UL-489 and IEC-60.947.2 rated devices, comply with latest revision.
3. 5Hz AC closing and 3Hz AC trip and clear.
4. Circuit breakers smaller than 100-amp trip shall be Molded Case Circuit Breakers type-MCCB and/or Current Limiting Circuit Breakers type-CLCB.
5. All circuit breakers 100 amp and larger trip shall employ sensors and solid state digital electronic automatic trip system. Short-time and long-time time/current curve shaping field adjustable functions and adjustable instantaneous trip.
B. Manufacturer
1. Circuit breakers as manufactured by the following companies only are acceptable:
a. Cutler Hammer
b. General Electric Co.
c. Siemens

d. Equal by Square D.

C. Configuration
1. Circuit breakers shall be arranged in the panels so that the breakers of the proper trip settings and numbers correspond to the numbering in the panel schedules on the Drawings.
2. Circuit numbers of breakers shall be black-on-white micarta tabs or other previously approved method. Circuit number tabs, which can readily be changed from front of panel, will not be accepted. Circuit number tabs shall not be attached to or be a part of the breaker.
3. Panelboard circuit protection devices shall be bolted on type for connection to panel bus. Removable and installable without disturbing adjacent devices.
4. Provide conductor wire terminations (lugs) on each circuit protection device for incoming main feeder, branch circuits and outgoing feeder circuits. Dual rated copper/aluminum and compatible with the respective conductor size, type, and quantity.
5. Where 2-pole or 3-pole breakers occur in the panels, they shall be common trip units. Single pole breakers with tie-bar between handles will not be accepted.
6. Branch circuit panels shall be field convertible for bottom entry main incoming feeder or top entry main incoming feeder.

D. Lock-Off and Lock-On
1. All circuit breakers shall be pad-lockable in the "OFF" position.
2. Where branch circuit breakers supply the power to motors and signal systems, the breakers shall also be furnished with lockout clips, mounted in the “ON” position. The breakers shall be able to trip automatically with lockout clips in place.
3. Provide lock-on clips on branch circuit breakers supplying fire alarm equipment and fire alarm panels. Provide identification of the dedicated "Fire Alarm" circuit function and operation. Color-code the circuit breakers to comply with AHJ Requirements.
4. Locking facilities shall be riveted or mechanically attached to the circuit breaker (submit sample for approval. Other means of attachment shall not be accepted without prior written approval of the Owner's Representative.

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2.4 PANEL BUSSING

A. Bus Material
1. Bussing shall be rectangular cross section tin-plated copper. Aluminum bussing shall not be used.
2. Bussing shall be non-tapped, full length of the enclosure.

B. Ground Bus
1. Each panel shall be equipped with a ground bus secured to the interior of the enclosure. The bus shall have a separate lug for each ground conductor. No more than one conductor shall be installed per lug. Panels designated with isolated ground busses shall have a second ground bus not bonded to the panel enclosure,

C. Provisions
1. Provide space and all hardware and bus mounting attachments for future devices as indicated on the Drawings.

2.5 TERMINAL AND AUXILIARY CABINETS

A. Cabinets
1. Fabricated of code gauge sheet steel for flush mounting (except where noted as surface) of size indicated on the Drawings, and complete with hinged lockable doors, provide the quantity of two-way feed through conductor terminals required for termination of all conductors, plus 15% spares of each type.
2. Cabinet locks to operate from same key used for panelboards. The trim to cabinets shall be fastened by means of concealed bolted or screwed fasteners accessible behind door into

cabinets. All cabinets shall have ⅝-inch plywood backing, finished with fireproof intumescent primer and finish coat paint. Provide equipment ground bus in each cabinet.

3. Cabinets shall be finished with one coat of zinc chromate and one coat of primer sealer after a thorough cleaning. Where exposed to public view (e.g., corridors, covered passages, offices, etc.) finish color paint to match surrounding and Manufacturer's standard gray color in switchboard, janitors, heater and storage rooms.
4. Provide grounded metal barriers inside cabinet to isolate and separate line voltage and low voltage from each other inside the cabinet.

B. Cabinet Dimensions.
1. Unless indicated otherwise on Drawings.
a. Shall be 20-inches wide. Surface or flush mounting as indicated.
b. Recess mounted type shall have a 20-inches wide (maximum) recess metal enclosure with overlapping edge trim plate cover extending 1-inch on all sides of enclosure.
2. Depth shall be 5.75-inches nominal. Height of cabinet as required for devices, plus 25% spare unused interior space for future use, but not less than 36-inches high.

C. Terminals
1. Non-digital analog circuits; line and low voltage modular signal systems, 15-amp dual row with isolation barriers, screw-down terminals insulated strips, heavy duty.
a. As manufactured by: Molex, or ITT-Cannon, or General Electric.
2. Digital circuits; low voltage signal systems, ANSI/EIA/TIA Category-6, 110-Block or 66-Block gas-tight punch down style, heavy duty.
a. As manufactured by: Leviton, Ortronics, or AMP.

D. Identification (Additional Requirements)
1. Provide engraved nameplate on each cabinet indicating its designation and system.
2. Identify each terminal landing with unique circuit number and provide corresponding alphanumeric text-index card inside panel access door

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PART 3 - EXECUTION

3.1 MOUNTING

A. Flush Mounted Panelboards and Terminal Cabinets shall be anchored to walls as indicated on the Drawings. Trim shall be flush with finished surface.
1. Panels and cabinets installed flush (recess or semi-recess) into fire rated or smoke rated walls. The wall recess shall be fully wrapped inside the recess with fire/smoke rated materials. The wrap-materials shall provide the same fire and/or smoke protection rating as the respective wall.

B. Surface Mounted Panels and Terminal Cabinets shall be secured to walls by means of preformed galvanized steel channels securely fastened to at least two studs or structural members.

C. Panelboards and Terminal Cabinets shall be installed to ensure the top circuit protective device (including top compartment control devices) are not more than 6-feet-6-inches above finish floor in front of the panel and the bottom device is a minimum of 12-inches above the floor. Manufacturer shall specifically indicate on Shop Drawing submittals each panel where these conditions cannot be met.

3.2 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. Manufacturer shall stencil the panel/cabinet number identification on the inside of door to correspond with the designation on the Drawings.

B. Identification Plates and Numbers shall be attached with screws or twist lock fasteners. Adhesive attachment of any kind shall not be used.

END OF SECTION 26 24 15 052125/1197003

SECTION 26 33 23 - CENTRAL BATTERY INVERTER

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation, and services necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under this Section.
   2. General Provisions and Requirements for electrical work.

B. Demonstration and Instruction (Additional Requirements)
   1. Provide on-site instruction classes and operation manuals to the Owner's Personnel.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. General
   1. Submit Manufacturer product data, mounting information, dimensional data, ambient environmental data and derating factors, electrical performance data.
   2. Submit performance and technical information on battery calculations and/or factory tests demonstrating capacity capabilities.

1.3 APPLICABLE STANDARDS (ADDITIONAL REQUIREMENTS)

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A. General
   1. The equipment shall be listed, labeled and approved for the application show in the Contract Documents, as a battery stored energy, emergency lighting electrical power inverter, complying with the most recent version of the following Applicable Standards.
   2. The following Standards shall become Requirements of Contract Document and are included in the Contract Documents.

B. Underwriters Laboratory - UL
   1. UL – 924 and 924A Standard for Emergency Lighting and Power Equipment.
   2. UL – 1778 Standard for Uninterruptible Power Supply Equipment.

C. National Fire Protection Agency - NFPA
   1. NFPA - 101Life Safety Code.
   2. NFPA - 111Stored Electrical Energy and Standby Power systems.
   3. NFPA – 70 Article 700 Emergency Systems.
      (NEC) Article 480 Storage Batteries.

D. Federal Communications Commission - FCC
   1. FCC - Class A RFI emission limits.

E. American National Standards Institute – ANSI
   1. ANSI – C62.41 and C62.45: Both Category-A and Category-B Transient Voltage Withstand.

F. Institute of Electrical and Electronic Engineers-IEEE
   1. IEEE – 587: Surge Voltages

G. Seismic Earthquake and Wind Loading Withstand, Testing and Certification (Additional Requirements).
   1. The complete emergency lighting central battery inverter assembly; including circuit protection devices, meter, housings/enclosures, batteries, accessories, supports/anchors etc., shall be designed, manufactured, and tested.
      a. Wind loading all outdoor equipment locations.
      b. Earthquake Seismic Requirements of CBC/IBC Seismic withstand all indoor and all outdoor equipment locations.
   2. Shall withstand, survive, and maintain continuous non-interrupted energized operation during seismic event occurrences and wind event occurrences. Continued normal energized operation after the wind event and seismic event occurrences have abated.
   3. Shall include demonstrations of successful operation and run test after completion of seismic event shake-table simulation. Acceptance test seismic qualification of proposed equipment shall employ triple axis shake-table simulation of the Required Response Spectrum (RRS) seismic event motion, certified and approved by the AHJ.
   4. Provide three-dimensional finite element analysis demonstrating anchor-age and operational withstand of wind loading not less than as follows and as required by AHJ:
      a. 110MPH-West Coast States USA, California, and Hawaii, per ASCE/SEI 7-16.

PART 2 - PRODUCTS

2.1 OPERATION

A General
   1. The Emergency Lighting Battery Unit (ELBU) shall be self-contained, automatic operation. Unit shall store electrical energy and supply standby back-up electrical energy upon failure of normal (utility source) power and provide operation of lighting and other connected equipment as described in the Contract Documents.
   2. ELBU shall consist of an automatic circuit transfer system, input/output circuits, storage batteries, battery charger, voltage inverters, monitoring, test/monitoring equipment and operating program software. Manufactured with all components enclosed in modular cabinetry.
   3. ELBU volt-ampere continuous load rating shall be sufficient to provide operation of the full unit rated load. But in no case less than required to supply all the connected loads shown on the Drawings.
      a. Normal mode load capacity operation duration shall be continuous.
      b. Emergency mode full 100% rated load capacity operation shall be for the duration time indicated on the Drawings, but not less than 90 continuous minutes.
   4. Unit shall operate properly in ambient temperatures from 15 to 25 degrees centigrade, sea level to 10,000 feet above sea level, at the specified ratings.
   5. Emergency lighting central battery unit shall be manufactured by Myers Power Products, Emergilite, Dual-Lite, or equal.

B. Operation
   1. During operation under normal mode 60Hz AC power, the supply voltage shall feed both the output load and the battery charger. Upon normal power failure, the output load shall be automatically transferred to internal 60Hz AC emergency mode power operation.
   2. When normal power is re-established, the output load shall be automatically transferred back to the normal power AC line and the charger shall commence recharging the batteries to their full capacity.

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3. Transfer to emergency mode operation shall occur when normal input voltage drops to less than 60% to 70% of nominal for brownout protection on any input line phase. The transfer to emergency mode shall also occur if there is an open circuit, or shorted circuit on the normal input side. A 15 to 60-second transfer time delay (nominal) back to normal mode operation shall be adjustable to reduce "cycling" operation between normal and emergency operating modes.

2.2 LOAD REQUIREMENTS

A. Load Types
1. Load output shall be provided for the following types of loads in any loading combination (0% to 100% of load rating), within the rated capacity (0% to 100% of load rating) for 50% (0.5) lag through 50% (1.5) lead load power factors.
2. Unit shall be suitable for operation and withstand inrush currents associated with the connected loads without damage or changes in its operation including:
   a. Electronic equipment including fire alarm equipment.
   b. Solid state electronic lighting fixture ballasts and dimmers.
   c. Electromagnetic lighting fixture ballasts and dimmers.
   d. LED (Light Emitting Diode) solid-state lamps and drivers.

B. Voltage
1. Normal power input and output voltage shall be as indicated on the Drawings.

C. Circuit Breakers Line and Load
1. Provide load output circuit breakers, ampacity and quantity as indicated on the Drawings.
2. Provide a unit main line input circuit breaker in the ELBU. The circuit breaker shall be sized to allow continuous full rated load operation of the ELBU, including battery-recharging loads.
3. Provide D.C. battery protection internal breakers.
4. The circuit breakers shall be thermal magnetic molded case type. The Main line input circuit breaker shall be rated not less than shown on the Drawings. Internal and load output circuit breakers shall be “series rated” or “fully rated” to the main input circuit breaker symmetrical short circuit interrupting capacity, at the specified input and output voltage(s).

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D. Load Output
1. Provide output load types as follows (in any combinations up to unit full rated output capacity).
2. Normally on - Output load is energized in both the normal and emergency modes.
3. Normally off - Output load is energized only when unit is in the emergency mode and de-energized when the unit is in the normal mode.
4. The unit shall function correctly with no load (zero-volt amp) connected to the output terminals. UNITS REQUIRING A MINIMUM CONNECT LOAD FOR CORRECT OPERATION ARE NOT ACCEPTABLE.

E. Load Output Voltage Characteristics
1. During the entire rated operation duration, output voltage shall be sinusoidal wave.
   a. Total harmonic distortion shall not exceed 5% under any combination of the specified load conditions.
   b. Voltage regulation shall not vary more than plus or minus 5% of rated voltage under all load conditions, no load 0% to 100% of full rated load.
2. Load output voltage frequency regulation shall be within plus or minus 0.5Hz under specified load conditions, when operating on the inverter and batteries.
3. Uninterruptible Power Supply (UPS) transfer to sustain all HID lamp lighting loads without disruption or loss of the “lamp-arc”, and without loss of full lamp output lumens. Less than 0.5 Hz total transfer time.

F. Efficiency When Operating In Any Mode
1. At 100% rated load – greater than 97%.
2. At 50% rated load – greater than 94%.
3. Efficiency shall be measured load output kW divided by the measured line input kW; with a connected load power factor of 0.8 lagging and the batteries fully charged operating on trickle float charge.

2.3 INVERTERS
A. General
1. Inverters shall be modular and completely solid state. Protected against overloads, inrush loads, and short circuits.
2. Inverter shall provide stable regulated output operation from the internal batteries under all specified load conditions.
3. Low battery voltage cutout shall be provided to disconnect the inverter load when the battery output voltage drops below a preset value.
4. Automatic unit restart after initiation and/or restoration of normal input power.

2.4 CONTROL, TESTING AND MONITORING EQUIPMENT
A. Internal control, monitoring and testing with programming software and micro-processor control operation shall be provided to verify proper system operation and trouble conditions. Control, testing, and metering display panel shall be installed in the door of equipment cabinet not more than 6-feet-0-inches above finished floor.
B. System Display/Control Panel
1. The system's display panel shall include an array of visual indicators, multi-line alphanumeric character display, and a keypad to control and monitor the system.
2. The array of visual indicators shall monitor and announce the AC utility presence, system ready status, battery charging status, battery emergency operation, and alarm functions.
3. The system shall display alphanumeric meter functions including:
a. Input-voltage and input demand load.
b. Output-voltage, output-frequency, output-demand load and output-power factor.
c. Unit internal component temperatures.
d. Total quantity of power outages and inverter operating time.
4. To ensure only authorized personnel can operate the unit, the system shall be password protected for all control functions, including parametric changes.
C. Alarms
1. The system shall have audibled and alphanumeric visual alarm display, with automatic logging of the twenty most recent alarm events. Each alarm will have a corresponding audible signal associated with it to aid in the troubleshooting of the system.
2. The system's alarm acknowledge feature shall enable the user to silence only the current audible alarm(s), while not silencing other alarms and not clearing the alarming condition until the fault has been cleared.
3. Alarms shall monitor low, near low, and high battery voltage; high AC voltage input; high and low AC voltage output; volt-amp output overload; low runtime remaining; high ambient component temperature over limit; check charger, battery, inverter, and memory / logic; emergency power off activated; user test check; and call service.
D. Manual and Programmable Testing
1. The system shall provide both manual test functions and software programmable automatic test modes. The user shall be able to perform a system test at any time.
2. The system shall also perform an automatic programmable, weekly, self-diagnostic test and load test of its subsystems to insure the system will operate in an emergency condition.

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A monthly load test for a user programmable discharge time and an annual test for a complete runtime discharge time and an annual test for a complete runtime discharge.

3. Automatic recording in memory, of the last twenty inverter events, including all automatic weekly and user programmed tests, shall be logged.

2.5 BATTERIES

A. General

1. Batteries shall provide capacity to operate the unit and maintain specified inverter output for indicated years on a pro-rata basis when properly maintained as recommended by the Manufacturer.
2. Flame arresting caps shall be provided on batteries, with catalytic conversion to prevent hydrogen out gassing.
3. Battery cases shall be translucent to allow visual observation of electrolyte level. Provide earthquake restraint battery mounting straps.

B. Battery Seismic Restraint

1. Batteries shall be installed in the unit with seismic restraint anchors and straps.

C. Battery Type

1. Batteries shall be sealed lead calcium non-maintenance type to eliminate the need to add battery water. Batteries shall have 10-year design life expectancy at 77-degree Fahrenheit ambient. Maximum battery discharge shall be automatically limited to 87.5% of nominal battery voltage, with full rated unit output during discharge.

2.6 BATTERY CHARGER

A. General

1. Battery charger shall be solid state specifically designed for the type of batteries used in the system.
2. Battery charger shall have automatic protection against short circuits, low battery condition, DC-over voltage protection and protected against thermal runaway.
3. Charger shall automatically maintain correct battery charge conditions, with float charging and periodic equalize battery charges, within plus or minus 0.05 volts of Battery Manufacturer's recommendations.
4. The charger shall completely restore fully discharged batteries from the input line source to full battery charge condition in less than 24 hours.

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2.7 CABINET

A. General

1. The cabinetry shall contain all components, inverter, transformers, power supplies, battery charger, including the batteries, free standing with hinged locking door. All components shall be accessible from the front for maintenance and removal.
2. Units requiring side access for cooling air or maintenance shall not be acceptable unless the Drawings specifically show the permitted side access space provisions.
3. Provide water shields on cabinets, to protect the ELBU from fire sprinkler discharge water damage.

B. Cabinet Construction

1. The cabinets shall be metal, NEMA 1 enclosure, equipped with a key-operated access lock.
2. Manufacturer's standard finish color with rust inhibitor "primer" and acid-resistant finish paint.
3. Battery shelves shall permit the batteries to be tested or have battery fluids added without having to remove the batteries.

4. The doors shall open fully without affecting the operation of the unit. Conduit knockouts shall be provided on both sides, bottom and top of the cabinet for connection of line and load circuits. Provide dead front or insulated covers over exposed energized parts to prevent accidental contact when doors are open.

C. Electrical Connections
1. Provide line and load terminal lugs and identification tags on all circuits.

D. Size
1. Maximum cabinet size including batteries shall not exceed those shown on Drawings.

2.8 COMMUNICATION PORTS

A. General
1. The ELBU shall provide a Standard RS-232 bi-directional serial communications port, for communicating with portable computers. Provide software with the ELBU for control, monitoring and diagnostic/ maintenance operations of the ELBU. The software shall operate on Microsoft-Windows® based, PC style computers, using 3.5-inch "floppy-disk" magnetic storage media, or 5.25-inch "CD/DVD" ROM.
2. The PC computer is not included in the contract scope of work.

B. Monitoring
1. Unit shall include self-diagnostics per NFPA 101 and shall keep in memory a history of all testing.
2. Unit shall include real time monitor and shall send an email notification to service personnel of any malfunctions.

PART 3 - EXECUTION

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3.1 TESTING

A. General
1. All units and batteries shall be inspected for damage as soon as they are received. Specifically check to see if wet cell batteries have been turned over in shipment and whether the equipment cabinets have received any severe dents which might cause internal damage. Remove and replace all damaged equipment with new undamaged equipment.
2. Use only the factory provided knock-out areas and conduit entry provisions on the equipment for wiring. Care shall be taken not to let metal slugs or chips get into the equipment cabinet.
3. Prior to energizing equipment, perform measurements on the incoming and load output AC lines to the equipment to ensure that the proper voltage level is available and that there are no ground faults or high potentials between conductors or between phase conductor to neutral/ground.
4. Prior to installing the fuses, or closing the circuit breaker in the battery circuit, verify correct battery voltage, polarity markings, battery electrolyte level and all electrical connections are secure.
5. Prior to turning the system on for any tests, the unit shall be bypassed with the mains connected to feed the load directly and the currents in each conductor measured and balanced. Follow Manufacturer instructions for installation, connection, and energizing equipment.
6. Batteries which are shipped with the electrolyte in the battery cells shall be maintained on a float charger when not installed and energized, operating the emergency power unit. Batteries shipped without electrolyte installed in the battery cells shall not have electrolyte added until equipment is installed and ready to be energized. Batteries which are not

handled with this procedure will be rejected, shall not be used and shall be replaced with new batteries at the Contractors' expense.

7. Provide factory authorized Field Service Technician factory start-up to inspect, energize, test and certify the correct system installation, connections and operation. Provide written acceptance field service report, six copies, to Owner's Representative.

B. Commissioning (Additional Requirements)

1. Setup, testing, startup, and Commissioning shall be performed by Factory Technician(s) trained, certified and authorized by the Equipment Manufacturer. Final Commissioning shall be performed after installation and connections are complete.
2. Provide system programming and setup of all control sequences for the emergency/exit lighting control system.
3. Simulate normal source power failure by opening (turn-off) building main service disconnect and verifying connections and operation of each electrical system device connected to the system on both normal power source and emergency power sources. Simulated test time for operating duration connected on the emergency systems shall be not less than 90-continuous minutes without failure or anomalies in the system.
4. Record and document electrical demand load and sequence of operations on the ELBU system with all connected loads operating.
5. Test all control system functions after the installation and connections are complete and the system has been energized. Verify each control sequence of operation and each device to be controlled are each operating correctly.
6. Record and document each device setup and program setting.
7. Submit written report (six copies) to Owner's Representative Certifying Commissioning has been performed; all respective systems are operating correctly and document all software setup and each device setting.

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3.2 SEISMIC EARTHQUAKE

A. General

1. The entire unit shall be installed and anchored to building structure to comply with Seismic Earthquake Requirements.
2. Install seismic restraints on all batteries.

3.3 FACTORY SERVICE AGREEMENT (FIRST YEAR OPERATION)

A. General

1. Provide site visits and written reports for each ELUB at unit start-up, commissioning, and again approximately 12 months after completion of testing and commissioning. Shall be included as part of the Base Contract Scope.
2. Factory authorized technician shall test all ELUB options, accessories and functions, physical, electrical and mechanical inspection. Simulate normal source power outage and recharge functions.
3. ELUB factory remote monitoring and reporting of each ELUB status, using telephone communications line provided by the Owner.
4. The Base Contract initial first-year-operation service scope shall be renewable, if mutual agreement between the ELUB Manufacturer and the Owner is accomplished for service cost, scope, and renew.
5. Provide three copies of factory service proposal renew agreement to the Owner's Representative.

END OF SECTION 26 33 23
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SECTION 26 50 05 - LIGHTING FIXTURES

PART 1 - GENERAL

1.1 SCOPE

A. Work Included:

All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:

1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
2. General Provisions and Requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

Provide complete Manufacturers Catalog Data Information for each light fixture (luminaire), driver, lamp, materials, auxiliary equipment/devices, finishes and photo-metrics.

1.3 QUALITY ASSURANCE (ADDITIONAL REQUIREMENTS)

A. Work and Materials shall be in full accordance with the latest Rules and Regulations. The publications shall be included in the Contract Document Requirements. If a conflict occurs between the following publications and any other part of the Contract Documents, the Requirements describing the more restrictive provisions shall become the applicable Contract definition:

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1. UL – Underwriters' Laboratory:
   a. UL – 8750 and 1598C: Light Emitting Diode – LED Equipment for use in Lighting Products and Replacements
2. NEMA – National Electrical Manufacturers Association:
   a. NEMA – LE4: Recessed Luminaries Ceiling Compatibility
   b. NEMA – SSL #1, #3 and #6: Electronic Drivers for LED; LED and Incandescent Lamp Replacement
   c. NEMA – LSD #44, #45, #49 and #51:SSL-solid state lighting
3. United States Federal Government:
   a. FCC – Part 18: EMI and RFI emissions limitations.
   b. EPA: Energy conservation publications and waste disposal regulations.
4. ETL and C.B.M. Certified and Approved.
5. Electrical installation standards, National Electrical Contractors' Association:
   a. NEIS/NECA/IESNA – 500: Recommended Practice for installing Indoor Commercial Lighting Systems.
   b. NEIS/NECA/IESNA – 501: Recommended Practice for installing Exterior Lighting Systems
   c. NEIS/NECA/IESNA - 502: Recommended Practice for installing Industrial Lighting Systems.
6. Illuminating Engineering Society – IES (IESNA):
   a. IES – LM41: Photometric and Reporting.
   b. IES – 587: Transient Surge Protection.
   c. IES – LM79: Solid State Lighting (SSL) Testing and Measurement.
   d. IES – LM80: Testing for Lifetime of LED.

7. ANSI-American National Standards Institute:
   a. ANSI – C81
   b. ANSI – C82
   c. ANSI – C62.41: Transient Withstand
   d. ANSI – C78: Lamps
8. State California Code of Regulations - Title-24: Energy Code

PART 2 - PRODUCTS

2.1 GENERAL

A. Complete Fixture
   1. Provide light fixtures complete including lamps, drivers, housings, ceiling and wall trim "rings" for each ceiling type, mounting and adapter support brackets, diffusers/lenses and outlet boxes.
   2. Include an allowance of $800.00 to furnish a light fixture for each lighting fixture outlet shown on Drawings without a fixture type designation. Include installation costs in base bid.

B. Specific Fixture Requirements and Fixture Schedule Information
   1. The catalog numbers included in the description of the various types of lighting fixtures shall be considered to establish the type or class of the fixture with a particular Manufacturer only. The fixture length, lumen outputs, component materials, accessories, mounting type, ceiling, wall and install adapters, operation voltage, and all other components required to fulfill the total description of the fixture based on all drawing information, branch circuits, voltages, Specification information, and shall be included in the Contract Requirements regardless of whether or not the catalog number specifically includes these components.
   2. Lighting fixtures shall be the types as indicated in fixture schedule on the Drawings and as described in the Specifications.
   3. All fixtures of the same fixture type shall be the same Manufacturer and of identical finish and appearance, unless indicated otherwise on Drawings.

C. Manufacturer Certification of Operation
   1. Lamps and power supplies (drivers) shall be recommended and certified by the respective Manufacturer(s), to be "matched" to operate correctly together, within the published characteristics, for efficacy, lamp starting, operating life hours, lumen output, power factor, power input, operating line ampere, sound intensity, and temperature.

2.2 LIGHT FIXTURES (LUMINARIES)

A. General
   1. Lighting fixtures shall have all parts, drivers, sockets, support attachments, trim flanges and fittings necessary to complete and properly install the fixture at the indicated installation locations. All fixtures shall be provided with lamps of size and type specified.
   2. Ceiling and/or wall surface mounted lighting fixtures shall not have any exposed chase nipples or conduit knockouts visible to view within fixture housing. Lighting fixtures mounted in continuous rows shall have chase nipples or conduit knockouts between lighting fixture housing but shall not have visible chase nipples/conduit knockouts on the visible ends of the continuous row of lighting fixtures.
   3. Where fixture color is indicated to be selected by the Architect and/or Owner's Representative, provide two color chip samples for each color for review.
   4. Recessed fixtures with attached junction box shall be provided with a junction box permanently attached to the plaster ring so that the junction box is accessible through the

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fixture opening when the fixture is removed. Connection between fixture and pull box shall be flexible metal conduit with not less than 16 AWG "AF" or "CF" type fixture rated copper wires, high temperature wire insulation for not less than 600 volts AC. The flexible conduit shall be sufficient length, so that when the fixture is removed, the pullbox is readily accessible.

5. Recessed fixtures shall be Underwriters' Laboratory approved for recessed installation with plaster frame and attached pull box. Lamp enclosure, reflectors and finish wiring shall not be installed until plastering is completed. Exposed finish trim shall not be installed until finished painting of the adjacent surface is completed.
6. The fixture shall bear Underwriters' Laboratory label of approval for the wattage and installation indicated.
7. Light fixtures installed outdoors, in damp or wet locations shall be UL labeled for said location as "damp-location" and "wet-location" for the respective installation location.
8. Fixtures in contact with thermal/building insulation shall be UL listed and rated for direct contact installation in thermal insulation systems.
9. Lighting fixtures installed in masonry and/or concrete construction. The fixture housing shall be rated for "concrete-pour" installation location.

B. Lens and Diffusers
1. Acrylic plastic or Plexiglas for the light fixture diffusers or fixtures lenses shall be 100% virgin material.
2. Diffusers shall be formed from cast sheet by a vacuum and/or pressure technique.
3. Lighting fixtures containing lamps with dichroic reflectors and light fixtures with non-dichroic lens/diffuser shall be rated for high temperature lamp operations resulting from lamp heat redirected (reflected) back into the fixture.

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2.3 SOLID STATE LIGHTING (SSL), LIGHT EMITTING DIODES (LED) LAMPS, POWER SUPPLIES, AND LIGHT FIXTURES (ADDITIONAL REQUIREMENTS)

A. General
1. Solid State LED light source (lamps), related control equipment (driver-power supply), and luminaire (light fixture) optics for light output distribution.
2. Shall comply with the US-DOE Energy Star Program for SSL-LED.
3. Shall comply with the latest revision IESNA LM-79 and LM-80. Submit
4. SSL chromaticity shall comply with latest revision NEMA and ANSI – C78.377.

B. LED Lamps
1. Lamp lumen output and overall efficiency shall be based on the LED lamps installed in specified fixture and ambient operating temperature.
2. Lamp Color Rendition Index (CRI) shall equal or exceed CRI – 80, unless noted otherwise on Drawings.
3. CRI and lamp color temperature shall be same for all light fixtures of the same fixture type.

C. LED Power Supply (driver)
1. Combination of power supply and SSL – lamp shall be tested and certified by respective Manufacturers for performance and proper operation.
2. Provide dimming type driver where indicated on Drawings. Driver and dimming equipment shall be tested and certified by respective Manufactures for performance and proper operation.

PART 3 - EXECUTION

3.1 LIGHT FIXTURE INSTALLATION

A. General

1. The Contractor shall verify actual ceiling and wall construction types as defined on the Architectural Drawings and furnish all lighting fixtures with the correct mounting devices, trim rings, brackets whether or not such variations are indicated by fixture catalog number. The Contractor shall verify depth of all recessed lighting fixtures with Architectural Drawings prior to ordering fixtures. Any discrepancies that would cause recessed lighting fixtures not to fit into ceiling shall be reported to the Owner's Representative prior to release of order to the supplier of the fixtures.
2. On acoustic tile ceilings, fixture outlets shall be accurately located in the center, at the intersection of the four corners or at the center of the joints of two tiles.
3. The Contractor shall aim the exterior adjustable lighting fixtures after dark in the presence of, and at a time convenient to the Owner's Representative.
4. Fixtures shall be ordered and furnished to operate correctly on the branch circuit voltage connected to the respective fixture as shown on the Site Plan and Floor Plan Electrical Drawings. The voltages shown on the fixture schedule are for generic fixture information only.
5. Install and connect lighting fixtures to the circuits and control sequences indicated on the Drawings and to comply with respective Manufacturer's instructions/recommendations.
6. Lighting fixtures in building interstitial spaces, in mechanical plumbing and electrical spaces/rooms, are shown in their approximate locations. Do not install lighting outlets or light fixtures until the mechanical, plumbing and electrical equipment/pipes/ductwork are installed; then adjust and install lighting in revised clear (non-interfering) locations to provide best even-illumination. Coordinate the locations with all other trades prior to lighting installation.

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B. Lighting Fixtures Installed in Ceiling Support Grids - suspended lay-in "T-bar" and concealed spline ceilings.

1. Provide two seismic clips at opposite ends of each recessed light fixture, the clip shall connect to the ceiling grid main runners and the light fixture. The light fixture with seismic clips and ceiling grid runner connections shall resist a horizontal seismic force equal to the total weight of the light fixture assembly.
2. Each light fixture weighing 40-pounds or less and where the respective ceiling grid system is "heavy duty" type, shall be suspended directly from the ceiling grid or shall be suspended independent of the ceiling grid support system as approved by the AHJ. Each light fixture weighing more than 40-pounds or where the ceiling grid system is not a "heavy duty" type shall be supported independent of the ceiling grid and independent of ceiling grid support system.
3. Each light fixture supported independent of the ceiling grid system shall be supported with a minimum of four taut independent support wires, one wire at each fixture corner.
4. Each light fixture supported directly from the ceiling grid or ceiling grid support system shall be additionally connected with a minimum of two independent slack safety support wires. One wire at each opposite diagonal fixture corner. Each 3-foot by 3-foot and larger light fixture shall be supported in the same manner, except provide a minimum of four independent slack safety wires, one at each fixture corner.
5. Light fixtures surface mounted to a suspended ceiling shall be installed with a 1½-inch steel "C" channel which spans across and above a minimum of two parallel main ceiling grid "runners" and concealed above the ceiling. Each channel or angle member shall be provided with a minimum of two threaded studs for attaching to the fixture housing through the lay-in ceiling tile. Two steel "C" channel members shall be installed for each 4-foot

(or smaller) fixture. Install the channels within 6-inches of each end of the light fixture to span a minimum of two ceiling grid parallel main runners. Provide two seismic clips connecting the ceiling grid main runners to each steel – "C" channel. Provide not less than two taut independent support wires connecting to each channel. Bolt the light fixtures to the threaded studs on the channels or angles, to support the light fixture tight to the ceiling surface.

C. Fixture Supports

1. The support wires for light fixture support shall be 12-gauge steel (minimum). The wires including their building and light fixture attachments shall provide support capacity of not less than four times the weight of the light fixture assembly. Provide additional light fixture support wires and building anchors to meet these Requirements, as part of the Contract. The support wires shall be anchored to the building structural elements above the ceiling.
2. Pendant mounting fixtures shall be supplied with swivel hangers. Fixtures shall swing in any direction a minimum of 45-degrees of gravity, position. Fixtures shall have special stem lengths to give the mounting height indicated on the Drawings. Stem to be single continuous piece without coupling, and to be finished the same color as the canopy and the fixture, unless otherwise noted. The Contractor shall check all lock nuts and set screws to rigidly secure the swivel socket to the stem, and the stem to the outlet box.
3. Fixtures shall be plumb and vertical. Where obstructions occur restricting 45-degrees free-swing of fixtures, the fixtures shall be "guy" wired to prevent fixtures from striking obstructions. The Owner's Representative shall approve method of guying. Swinging fixtures shall have an additional safety hanger cable attached to the structure and the fixture at each support, with the capacity of supporting four times the vertical weight of the light fixture assembly.
4. Suspended fixtures weighing in excess of 40-pounds shall be supported independently of the fixture outlet box. Provide "aircraft" (minimum 12 gauge) steel hanger cable for suspended fixtures route cable concealed or in pendant where possible. Each cable attachment shall support four times the weight of the fixture assembly. Securely attach the cable to the building structure.
5. Surface mounted fixtures installed on drywall or plaster ceilings and weighing less than 40-pounds may be supported from outlet box. Provide structural supports above drywall or plaster ceilings for installation of fixtures weighing more than 40-pounds and secure fixture to structural supports. The use of toggle bolts is prohibited.

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3.2 LENS AND DIFFUSERS

Lens, Diffusers, Internal Reflectors shall be completely cleaned of all dust, dirt and fingerprints after the installation of the light fixtures and lamps, and after all trades have completed work and prior to occupying the facility by the Owner.

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SECTION 27 20 00 – STRUCTURED CABLING

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specifications Sections and Drawings for related work required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

B. Provide Structured Cabling Infrastructure for the following systems:
   1. Computer Data Networks
   2. Telephone Voice Communications.

C. Provide MDF rack and Category 6A connectors in outlet boxes and on patch panels in equipment racks as shown on Plans. Using the conduits and pathways shown on the Plans provide the following:
   1. Six strands of multimode fiber optic cable from MDF to the main telephone backboard.
   2. Six strands of single mode fiber optic cable from MDF to the main telephone
   3. 25-pair Category 5 multi-pair cable from MDF to the main telephone
   4. One Category 6A copper cable from MDF to each Category 6A connector shown on the Plans.
   5. Patch panels, patch cords, punch blocks, and accessories at MDF and main telephone backboard as required to terminate all cables.
   6. Rack space for City-furnished network electronic equipment and file servers.

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1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Drawings Submittals
   1. Submit redrawn Building Floor Plan showing MDF, fiber optic cables, and all Cat 6a outlets and connectors in the project.
   2. Plans shall show identification numbers on all Cat 6a connectors corresponding to ID numbers on MDF patch panels.
   3. Provide Scaled Elevation Drawing of MDF equipment rack, showing location and arrangement of each rack component, and cable training provisions.

B. Submit Manufacturer's standard catalog data for each component. The submittal shall list the name, the proposed model and Manufacturer for each item as well as a reference indicating the specific piece of data which can be easily located in the brochure. The Manufacturer's data sheets shall be marked to indicate the specific item being proposed in cases where the sheet covers several types or sizes of items.

C. Submit rough-in box requirements for all outlets.

D. Provide proposed nameplate and outlet identification/color coding system. Indicate proposed identification naming sequence and methods, itemized for review.

E. Submit proposed warranty statements that will be in effect when the installation is complete.

F. Submit installer qualifications.

1.3 APPLICABLE STANDARDS

A. Individual Component Production/Manufacturer Testing and Labeling.
   1. The equipment shall be UL listed, labeled, and approved for the application shown in the Contract Documents.
   2. ETL (USA) each network systems infrastructure component. Third party testing, documentation and certification for performance compliance of each component with the UL, ANSI, and TIA Applicable Standards specified in the Contract Documents.

B. The complete system material, equipment, testing, installation, workmanship and installed performance shall comply with the Mandatory Requirements and the Guideline/ Recommendation Requirements of the following latest published version, supplements, latest revision including Addendums and TSB. Both the mandatory and advisory criteria shall be included as Requirements of the Contract Documents:
   1. TIA 526 – Optical Power and loss measurements – multimode and single mode fiber.
   2. ANSI/TIA-568C - Commercial Building Telecommunications Standards.
   3. ANSI/TIA-569B – Commercial Building Standards for Telecommunications Pathways.
   4. ANSI/TIA-570A - Residential Telecommunications Standard.
   5. ANSI/TIA-598B - Optical Fiber Cabling Color-coding.
   6. ANSI/TIA-606A - Administrative Standard for Commercial Telecommunications Infrastructure.
   7. ANSI/TIA-607 - Commercial Buildings Grounding and Bonding Requirements for Telecommunications.
   8. FCC – FYU/FT6.
   9. ISO/IEC 11801
   10. National Electrical Code (NEC) and California Electrical Code (CEC) including Articles 770 and 800 with ETL verified testing and local Code Jurisdictions.
   11. NECA/NEIS, National Electrical Contractors Association, National Electrical Installation Standards:
      a. 301 – Standard for Installation and Testing for Fiber Optic.
      b. 568 – Standard for Installing Building Telecommunications Bonding and Grounding.
      c. 607 – Telecommunications

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C. The entire completed Electronic Network Systems Infrastructure shall be tested and provide electronic data/network and telephone/voice multi-channel communications latest Revisions, Standards and Addendums for the following protocols:
   1. IEEE 802.3/ETHERNET latest revisions:
      a. 10Mbps 10Base-T, 100Mbps 100Base-Tx, and 1000Mbps (1Gbps) 1000 Base-Tx for copper wire; 100-meter communications pathway distance.
      b. 10Mbps 10Base-F1, 100Mbps 100Base-FX, 1000Mbps 1000Base-Lx-Sx and 10,000 Mbps (10Gbps) for fiber optics; 550-meter communications pathway distance, OM4 Standard.
      c. IEEE-802.3 for Power Over Ethernet (POE) and Power Over Ethernet-Plus (POE Plus).
   2. FDDI - Distributed data interface on fiber or copper wire, 100Mbps.
   3. 100VG – Any LAN
   4. TIA Serial and Bi-Directional RS-232 and RS-485, including Star-Hub repeaters.
   5. ANSI - TPPMD 55Mbps, 155Mbps and 622Mbps Asynchronous Transfer Mode - ATM.

D. The complete telephone/voice infrastructure system shall be suitable for the telephone/voice analog and digital communications and VoIP protocols.

E. Installation of all infrastructure equipment, devices, splices, terminations, cables, outlets, etc. shall comply with Manufacturer's recommendations.

1.4 EQUIPMENT QUALIFICATIONS

A. Equipment

1. The Supplier of the equipment shall be the factory authorized Distributor and service facility for the brands of equipment and material provided.
2. Network systems, infrastructure, equipment and materials shall all be the product of one of the individual same Manufacturers as follows. Typical unless specifically described otherwise:
   Belden – 10GX series; or CommScope-Systimax X10D Series:
   or AMP/Tyco – NetConnect Series.
   or Ortronics/Legrand – NetClear Series
   or equal.

B. Installation Certification

1. Work and material for cables, cable terminations, outlets and related components for infrastructure systems shall be performed by Certified Installers. The Installer shall be certified by the Respective Product Manufacturers.
2. The Manufacturers of the indicated work and material shall provide an Installer education/ training and certification program for the supplied products.
3. The Installers performing the Contract work for the indicated products shall have attended and successfully completed each of the respective Manufacturer's installation training education programs for the specified products.

C. Extended Material and Performance Warranties

1. In addition to the warranty Requirements described elsewhere in the Contract Documents, provide extended material and performance warranties. The warranty period shall be for not less than 20-years from the Contract Notice of Completion.
2. Warranty scope includes materials and performance for network cables and terminations, network workstation plug-in outlets, and patch panel plug-in outlets, cable splices, and connectors.
3. Repair or replace the defective material with new material at the project premises, to comply with the performance standards outlined in the Contract Documents during the warranty period.

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1.5 ABBREVIATIONS

Abbreviation	Terminology
ACR	Attenuation to Cross Talk.
AHJ	Authority Having Jurisdiction.
Backbone	Circuit interconnections between MDF and IDF patch panel locations.
dB	Decibel.
dBm	Decibel referenced to a milliwatt.
Demarc	Demarcation location where operational control change occurs or ownership change occurs.
ft.	Feet.
GHz	Gigahertz.
Gbps	Gigabits per second.
Horizontal Connection, and/or Horizontal wiring	Circuit interconnections between individual workstation outlet location to respective IDF or MDF equipment rack patch panel.
IDF	Intermediate Distribution Frame (horizontal or vertical cross connect) for an individual building area/floor.
km	Kilometer-lkm.
kPSI	1000 pounds per square inch.

m	Meter = 39.37 inches.
Mbps	Megabits per second.
MDF	Main Distribution Frame (central/main cross connect) for multi-building site or for a single individual building.
MHz	Megahertz.
MIC	Micrometer
mm	Millimeter = 10^{-3} meter.
NEXT	Near end cross talk.
nm	Nanometer = 10^{-9} meter.
pF	Picofarad = 10^{-12} farad.
Provide	Furnish, install, and connect.
RTDE	Equipment rack-mount fiber optic termination distribution enclosure, with fiber optic patch panel.
RMSE	Equipment rack mount fiber optic enclosure, splice only (without patch panel).
STP	Shielded individual twisted pairs copper wire.
ScTP	Shield Screened Twisted Pairs copper wire.
um	Micrometer = 10^{-6} meter.
USE	Universal Splice Enclosure.
UTP	Unshielded twisted pairs copper wire.
VoIP	Voice communications Over Internet Protocol.
WGNA	WideBand Gigabit Networking Alliance.
Workstation or Workstation location	Spaces remote from the MDF/IDF terminal room/closet, where user equipment interacts and connects with the electronic systems infrastructure equipment connection outlet device.
WMIC	Wall Mount fiber optic cable Interface Cabinet.

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1.6 MATERIALS AND METHODS

A. Material and Labor not complying with the Contract Documents shall be removed by the Contractor from the Project Site. Material and labor complying with the Contract Documents shall be provided.

B. All the cost to remove deficient work and material, provide work and material complying with the Contract Documents and the direct, indirect, incidental damages and Contract delays resulting from complying with these Requirements shall be the sole responsibility of the Contractor and shall be included in the bid price.

C. System Performance Requirements

1. The work, performance and type of materials provided as part of the Contract shall comply with ANSI/TIA-568C and related Standards for Category 6e cabling systems.

PART 2 - PRODUCTS

2.1 FIBER OPTICS CABLES

A. General

1. Operating temperature range -20 degrees centigrade through +60 degrees centigrade. Cables shall be flame retarding.
2. Electronic network systems infrastructure cables that are not installed inside conduit raceways. Electronic network systems infrastructure cables that are installed in concealed spaces including plenums and non-plenums; access floors, ceiling spaces, walls, floor, etc., and/or installed without continuous raceways. The cable insulation and jacket shall be

listed and labeled "Limited Combustible Cable" (LC or LCC) and shall comply with the latest published revision of all of the following Additional Requirements.

a. Limited combustible "FHC-25/50" per UL-2424.
b. NEC/CEC; CMP, additional listing/labeling where the installation location is an environmental air plenum, fiber optic "FHC-25/50-CMP and/or OFNP/OFCP".
c. NFPA-90A; ceiling cavity plenums, wall cavity spaces and raised floor cavity plenums, limited-combustible.
d. NFPA-5000; defines combustible material including wire and cable.
e. NFPA-75 computer rooms and electronic equipment rooms.
f. NFPA-13; spaces containing "limited combustible loading".

3. Cables shall qualify as 100% recyclable materials disposal, RoHS regulation complaint.
4. All fibers in a multi-fiber cable shall be fully operational within the performance characteristics specified prior to and after the cable is installed. The use of spare fibers in the cable to compensate for defective fibers is not permitted. Defective cables shall be removed and replaced with fully functional cables at no additional cost to the Contract.
5. Cables shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with Specified Requirements. ANSI/TIA -568C including related Standards, Amendments, and TSB.
6. Each fiber shall be individually identified with factory color-coding or factory imprinted label. The outer cable jacket shall be imprinted with date, Manufacturer's model, and catalog number, along with Agency Listing Identification.
7. Fiber optic cable shall be a product of the same Manufacturer, including portable patch cables.
8. Cables installed in raceways or conduits below grade, through in-grade manholes or pull-boxes shall be rated for installation in water/wet locations.
9. Provide overall outer jacket enclosing all fibers inside jacket. Cables containing less than seven fiber strands shall be provided with a color-coded outer jacket (red or orange).
10. Multimode (50/125)
    a. 50/125 fiber optic cables optical fibers, graded index multimode optical glass fibers, 50.0-micron fiber core and 125-micron fiber cladding, 0.2 numerical apertures. Optical fibers shall be 100 kPSI proof tested, with maximum 0.7 micron flaw size for dual operation at 850nm and 1300nm wave lengths.
    b. Minimum bandwidth:
       @ 850nm-wavelength 3500MHz per km length
       @ 1300nm-wavelength 500MHz per km length
    c. Maximum attenuation:
       @ 850nm-wavelength 3.0dB @ 1km length
       @ 1300nm-wavelength 1.0dB @ 1km length
    d. Laser-optimized "OM4" optical multi-mode standards.
11. Single mode:
    a. Fiber optic cables optical fibers, (8.3/125) single mode optical glass fibers, 8.3-micron core fiber and 125-micron fiber cladding, 0.11 numerical apertures. Optical fibers shall be 100-kPSI proof tested, with maximum 0.7-micron flaw size, for operation at 1310nm and 1550nm wavelengths.
    b. Maximum attenuation:
       @ 1310nm- wavelength 0.5 dB @ 1km length
       @ 1550nm- wavelength 0.4 dB @ 1km length
    c. Maximum dispersion
       @ 1310nm- wavelength 2.8 ps/nm km length
       @ 1550nm- wavelength 18.0 ps/nm km length

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d. Laser-optimized "OS1"/OS2" optical single mode standards.

B. Indoor/Outdoor Cables

1. The cable shall be fungus resistant, UV resistant, moisture resistant for installation indoors with or without an enclosed raceway and outdoors in underground enclosed raceway/ conduit and manholes/pullboxes continuously flooded with water, and in conduits exposed to the sun.
2. Each optical fiber shall be primary coated with 500-micron uniform acrylate tight buffered and with elastomeric uniform 900-micron diameter tight buffered, secondary coating. Aramid yarn strength member elements shall be tensioned and symmetrically and uniformly distributed around the fibers, along the length of the cable.
3. An overall cable jacket uniformly extruded directly around and mechanically interlocked with the optical fibers/strength members. The extruded jacket shall form internal helical cusped ridges that interlock with the optical fibers and strength members. The interlocking jacket shall not allow cable fibers to move axially within the cable jacket.
4. Cables containing more than 24-optical fibers shall be constructed with sub-cable fiber bundles. Each sub-cable bundle shall contain equal quantities of optical fibers, with a separate PVC jacket around each sub-cable. Sub-cable and sub-cable jacket construction shall match the overall Cable Requirements and Jacket Requirements.
5. The cable shall be UL listed and comply with CEC and NFPA Requirements for each installation location shown in the Contract Documents. ETL tested and certified to comply with or exceed Specified Requirements.
    a. CEC -OFNR (Vertical Riser Type Locations) OFNP (UL FHC-25/50 LC Plenum Type Locations and locations where not continuously enclosed inside conduits for entire cable length).
    b. CEC -OFNG (where continuously enclosed inside conduits for entire cable length).

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2.2 COPPER WIRE CABLES (TWISTED PAIRS)

A. General

1. Conductors shall be copper wire, individually insulated and color-coded, with multiple conductors arrange in twisted pairs.
2. An overall non-conductive jacket shall encase the copper wires and any shielding (where shielding is specified) shall also be encased by the jacket.
3. Cables shall be UL listed, complying with CEC – California Electrical Code, National Fire Protection Agency and NFPA Requirements for each installation location shown. ETL tested and certified to comply with or exceed Specified Requirements.
    a. NEC – MPP/CMP, FHC-25/50 (plenum type locations and locations where not continuously enclosed inside conduit).
    b. CEC – MPR/CMR (Vertical riser type locations).
    c. ANSI/TIA-568C; including related Standards, Amendments, and TSB.
4. Electronic network systems infrastructure cables that are not installed inside conduit raceways. Electronic network systems infrastructure cables that are installed in concealed spaces including plenums and non-plenums; access floors, ceiling spaces, walls, floor, etc., and/or installed without continuous raceways. The cable insulation and jacket shall be listed and labeled “Limited Combustible Cable” (LC or LCC) and shall comply with the latest published revision of all of the following Additional Requirements.
    a. Limited combustible “FHC-25/50” per UL-2424.
    b. CEC: CMP, additional listing/labeling where the install location is an environmental air plenum, copper wire “FHC-25/50-CMP”.
    c. NFPA-90A; ceiling cavity plenums, wall cavity spaces and raised floor cavity plenums, limited-combustible.

d. NFPA-5000; defines combustible material including wire and cable.
e. NFPA-75 computer rooms and electronic equipment rooms.
f. NFPA-13; spaces containing “limited combustible loading”.

5. Cables shall qualify as 100% recyclable materials disposal, RoHS regulation complaints.
6. Cables installed in air plenums, air handling spaces and cables installed without raceway or conduit shall also be UL listed and labeled for installation in air plenums.
7. The outer cable jacket shall be imprinted with date, Manufacturer’s model and catalog number and agency (AHJ) listing identification.
8. Cables installed in raceways or conduits below grade, through in-grade manholes and pullboxes shall be rated for installation in water/wet locations.
9. Copper Wire Electronic Network Systems Infrastructure cable shall be a product of the same Manufacturer, including portable patch cables.

B. Category-6A Computer/Data Cables – UTP
1. Category-6A cables shall be tested and shall pass the ANSI/TIA test recommendations for Category-6A.

2.3 FIBER OPTIC FIBER CONNECTORS AND INTERCONNECTION COUPLERS

A. General
1. The connectors and interconnection couplers shall be compatible, maintain the same Performance Category rating, and be compatible with the corresponding fiber optic cable type attached to the connectors.
2. Fiber optic cable connectors and interconnection couplers shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed Specified Requirements. Connectors and couplers shall comply with ANSI/TIA-568C, related Standards, Amendments, TSB, and TIA-Fiber Optic Connector Intermateability Standard (FOCIS) documentation.
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3. Fiber optic connectors and couplers shall be the product of the same Manufacturer.
4. Shall be UL listed and comply with UL94V-0.
5. Color code connectors for fiber optic cables to match the respective fiber optic strand/ jacket color.

B. Fiber Optic Fiber Connectors
1. LC – Small Form Factor (SFF) termination connector
a. Ceramic oxide 1.25mm ferrule. Mechanical durability is not less than 500-mating cycles. Insertion loss of mated connector shall be less than 0.3dB at specified wavelengths.
b. Strain relief boot, long boot type unless indicated otherwise, short or angled boot type to match the connector installation application. Provide dust cover cap for each connector.
c. Locking type to automatically align mating fibers in the fiber cable and prevent accidental rotation and pullout.

C. Fiber Optic Fiber Interconnection Couplers
1. Interconnection couplers shall be “like-to-like” compatible and shall provide "plug-in" coupling of two fiber optic cable connectors terminated with fiber optic fibers front-to-rear "in-line" together. The coupler shall provide interlocking, automatic optical self-alignment of two mating fiber optic connectors.
2. The centerline to centerline spacing of the interconnection couplers shall allow removal and insertion of portable patch cords, fiber cable connectors for both “single” and “duplex” type fiber adapter connectors without interfering with adjacent connectors.

3. Patch panel mounted interconnections couplers shall be factory pre-mounted to a modular nominal 0.09-inch-thick metal panel, couplers aligned and anchored on the plate.
   a. The metal panel shall be predrilled for standard EIA mounting in high-density 19-inch-wide metal patch panel frames.
4. Interconnection couplers in workstation outlets shall be installed in outlet boxes with cover plates.
5. Provide removable dust caps for the front side of each coupler.

2.4 COPPER WIRE OUTLET CONNECTORS

A. Connectors shall be Category 6A complying with ANSI/TIA 568C, female modular jack 8-position/contact "RJ-45" style, related Standards, Amendments.
B. Connectors shall comply with FCC part-68 Subpart F for gold plating.
C. Shall be UL listed and shall comply with UL94V-0

2.5 FIBER OPTIC FIBER DISTRIBUTION ENCLOSURES

A. General
   1. Fiber optic fiber distribution enclosures shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed Specified Requirements, ANSI/TIA – 568C including related Standards, Amendments and TSB.
   2. Fiber optic fiber distribution enclosures shall be the product of the same Manufacturer.
B. Equipment Rack Mount Fiber Optic Termination Distribution Enclosure - RTDE
   1. The RTDE enclosure shall be mounted in an EIA Standard 19-inches wide enclosed or open frame equipment rack assembly. The RTDE enclosure shall be metal, painted finish, Manufacturer's standard color.
   2. The RTDE shall provide the following self-contained functions internal to the RTDE assembly.
      a. Fiber cable termination.
      b. Fiber cable "pig-tail" splicing.
      c. Fiber cable patch panel.
      d. Fiber Cable Management, training, and strain relief.
      e. Individual fiber and patching port identification numbers, color-coding of incoming trunk and out-going distribution fiber ports.
      f. Plug-in fiber optic interconnection couplers for port-to-port patching with portable fiber optic patch cords.
   3. Fiber splice-drawers:
      a. Horizontal sliding metal drawers adjustable to approximately 30-degree angle when fully open, and removable for easy access. Each drawer shall contain two fiber optic splice trays with tray holders.
      b. Drawers shall stack vertically one above the other in the RTDE and allow sufficient slack in all fiber cables for removal of the drawer and splice trays.
      c. Provide one sliding drawer and two splice tray assemblies for each group 24-individual fibers or fewer fibers per group) of fiber optic fibers terminated in the equipment rack, but in no case provide no fewer than two sliding drawers with splice tray assemblies in each RTDE.
   4. Fiber cable patch panel
      a. Metal panel shall provide a patch port for each fiber consisting of metal panel mounted fiber optic interconnection couplers for each fiber optic fiber indicated to be terminated at the RTDE.

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b. The fiber optic fiber interconnection coupler shall be provided to match and be compatible with the fiber cable connectors. Quantity shall match quantity of terminated fibers, unless indicated otherwise on the equipment rack schedules.
c. Nominal panel thickness 0.09 inches.
d. Provide a minimum of sixteen unused spaces for additional couplers in the patch panel.

5. Nominal height of the RTDE shall not be exceeded, as follows:

Quantity of Patch Ports	Quantity of Splice Drawers	Nominal Height
24	2	11 inches
48	2	11 inches
72	3	14 inches
144	6	28 inches

C. Wall mount fiber optic patch panels for use at main telephone backboard:
1. Enclosure shall be compact, and wall mounted fully enclosed non-locking, with painted finish, Manufacturer's standard color.
2. The enclosure shall include accessories required for the specified single mode and multimode fiber optic cables to terminate on connectors for future patch connection to tel/data equipment.
3. Each connector shall be labeled to match corresponding connector at MDF rack.

2.6 COPPER WIRE PATCH PANELS

A. General
1. Copper wire patch panels shall be UL listed, complying with National Electrical Code, ETL tested and certified to comply with or exceed Specified Requirements, ANSI/TIA-568C including related Standards, Amendments and TSB.
2. Copper wire patch panels shall be the product of the same Manufacturer.

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B. Equipment Rack Mounted Patch Panel
1. Standard EIA 19-inches wide metal panel, Manufacturers standard color. Pre-punched for copper wire outlet connectors. Panel shall mount on an EIA Standard 19 inches wide enclosed or open frame equipment rack assembly. Nominal 24-copper wire outlet connectors in a horizontal row, quantity of rows as required for total quantity of connectors. Provide not less than two spare empty rows for future copper wire outlet connectors.
2. The patch panel shall provide the following self-containing functions.
a. Copper wire cable termination including conductor/shield termination and strain relief.
b. Plug-in copper wire outlet connectors for port-to-port patching with copper wire portable patch cords.
3. Patch panel height shall be based on the quantity of copper wire outlet connectors described plus the specified space for future outlets and shall not exceed the following dimension height:

Outlet Quantity	Nominal Patch Panel Height
1-24	3.5 inches
25-48	7 inches
49-72	14 inches
73-96	21 inches

4. Horizontally mounted, cable support metal bracket shall be provided for each 24-outlet/ connector groupings. The brackets shall be bolted to the equipment rack located at the backside of the patch panel; the brackets shall support and provide strain relief for each incoming copper wire cable connecting to the patch panel.

5. The copper wire connector installed in the patch panel shall be the same configuration, Manufacturer and type as the corresponding copper wire connector provided in the remote workstation outlet locations connecting to the respective patch panel outlet, unless indicated otherwise.

2.7 EQUIPMENT RACK

A. General

1. An equipment grounding bus, nominal 19-inches long, UL labeled as a ground terminal bus, shall be provided on each equipment rack. The ground bus shall be bolted to the rack main metal frame member with 1-inch standoff non-insulating bolts. Provide a minimum of ten drilled and taped bolt holes in the ground bus with ground lug bolts, for connection of equipment grounding conductors to the ground bus, size to accept ground conductors' #14-#4 AWG.
2. Vertically mounted, cable management enclosed metal channels (aluminum or stainless steel) shall be provided full height, continuously along the side of each vertical rail of the equipment rack. The channels shall be bolted to the equipment rack. The channels shall train, and dress vertically routed portable patch cords connecting between outlet connectors located in the equipment rack or in adjacent equipment racks. Vertical metal channel nominal size 6-inches by 6-inches square with removable access covers.
3. Provide horizontal cable management panels with multiple cable training rings on each panel (not less than five rings for each panel). Management panels (for up to 24-outlet groupings) nominal 19-inches wide by 1.75-inch high by 3-inches deep and/or (for up to 48-outlet groupings) 3.5-inches high by 3-inches deep, for EIA rack installation. Rings shall provide horizontal routing and support by grouping portable patch cords connecting between patch ports in the same equipment rack or adjacent racks. Patch cords shall be grouped and bundled with "Velcro" tie wraps and shall not overlap patch fields or rack mounted equipment. The cable management panels shall be installed on both the front and rear of the equipment racks, mounted both above and below horizontally between groups of patch ports as follows:
   a. One cable management panel (front and rear of rack) for each group of 48 or less copper wire outlets for patch ports.
   b. One cable management panel (front and rear of rack) for each group of 48-fiber optic outlet patch ports.
4. The entire rack assembly including any support arms shall comply with seismic install location earthquake structural standards.
   a. The assembly shall provide support for the weight of the equipment installed on the rack, but in no case less than 500-pounds of equipment, plus the weight of the rack and connecting cables. A 2.0-time safety factor shall be included in the equipment rack assembly structural design.
5. Provide pre-drilled mounting holes the entire length of equipment vertical mounting frames, EIA-310D, 19-inches (nominal) wide standard spacing for indicated equipment. Racks shall provide 17.75-inches (nominal) equipment horizontal mounting space between vertical rails.
6. Provide floor standing equipment rack with wall bracket support arms extending from the stationary portion of the rack to adjacent wall\
7. Provide a copper ground – bus for equipment bonding, in each equipment rack.
8. Equipment racks shall be Manufacturer's standard rust inhibitor primer. Manufacturer's standard color finish paint over primer, unless noted otherwise.

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B. Fixed Position Floor Standing Open Frame Equipment Racks:
   1. Floor mounted self-supporting rack, nominal 78-inches of usable mounting frame height for equipment.
   2. Bolted or welded hot dip galvanized steel or gold irradiate finish aluminum support frame. Hardware shall be stainless steel.
   3. Enclosed rack construction, fixed, non-swing gate. Provided vented side panels and smoked plexiglass hinged and pad-lockable front door and hinged rear panel. Provide thermostatically controlled ventilation fan to draw air through the rack for cooling.
   4. "Four-post" style for equipment racks.
   5. Rack as manufactured by Chatsworth, B-Line; or Saunders; or equal.

C. Plug Strip Surge Protection Device (SPD).
   1. Provide a self-contained unit combining plug-in receptacle strip and SPD in each equipment rack. Plug strip shall be 48-inches long, run vertically in each rack, nominal 120-volt +10%, 60Hz, AC, 1800-watts full continuous load. Red illuminated on-off switch with locking safety cover.
   2. 6-foot, 14-AWG three conductor grounded, high abuse heavy duty jacketed AC, line cord with NEMA 5 15P cap.
   3. Provide eight protected NEMA 5-15R 15-amp, AC 60Hz receptacles spaced a minimum of 5-inches on center over the length of the strip**.**
   4. AC surge suppression joule rating: 1650.
   5. UL let through rating: 500V UL verified, and EMI / RFI filtering.
   6. Eaton/Tripp-Lite # SS480806 series or equal.

2.9 SPLICE TRAY FIBER OPTIC FIBERS

A. General
   1. Trays shall be suitable for installation in RMSE and RTDE enclosures.
   2. The trays shall be the product of the same Manufacturer as the respective enclosures.
   3. Splice trays shall be UL listed, complying with national Electrical Code, ETL tested and certified to comply with or exceed Specified Requirements, ANSI/TIA-568C including related Standards, Amendments and TSB.

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B. Splice Trays
   1. A metal or non-metal splice tray shall provide space for up to 24-splices of individual fiber cable single mode and multimode optical fibers. The trays shall provide individual splice holder inserts for each splice to adapt the tray for mechanical or fusion splices, with or without splice sleeves.
   2. The tray shall incorporate integral fiber tie down clamps, fiber routing rings, provide strain relief and two full 360-degree fiber loops around the tray perimeter with sufficient slack fiber for removal of the tray for access and splicing of the fiber cable. The tray shall insure the minimum bending radius of the optical fibers is not violated.
   3. Provide a removable clear plastic tray top cover for each tray, to protect and isolate the fibers.

2.10 WORKSTATION OUTLETS

A. General
   1. Engrave outlet cover plates with the port number corresponding to the port number at the respective terminal block, patch panel, or head-end equipment.
   2. The outlet cover plates shall be factory pre-punched and formed to accommodate the installed outlet connector with attachment screws.

3. Workstation outlets shall be UL listed, complying with National Electrical Code, ETL Tested and Certified to comply with or exceed Specified Requirements, ANSI/TIA-568C including related Standards, Amendments and TSB.
4. Workstation outlets shall be the product of the same Manufacturer.

B. Computer/Data Workstation Copper wire Outlets
1. The outlets shall be the same configuration and type as the corresponding connector provided in the copper wire patch panel outlet, unless noted otherwise.
2. ANSI/TIA-568C, and related Standards, Addendums and TSB.
3. The copper wire outlet connectors for twisted pair wire connections in computer work-station outlets shall be universal outlet connector RJ-45 type.

C. Outlet Boxes
1. General for Low Voltage Outlets Requirements
   a. Shall be UL-approved and labeled for Life-Safety Appliances.
   b. UL listed and label for low voltage CEC/NEC class-2 wiring and devices.
   c. Shall be adjustable to fit into the wall/ceiling and attach into the wall/ceiling thickness at each install location.
   d. Provide cable “Strain-Relief” attachment and “Sharp-Edge” protection for each outlet cable connections.
2. Wall mounted
   a. Flush or surface and size wall mounted outlet box as indicated on the Drawings, but in no case less than 4.69-inches by 4.69-inches by 2.125-inches deep.
   b. One or two gang wide extension ring for outlet box to extend outlet flush with finish surface, or as noted on the Drawings.
   c. One or two gang wide cover plate, or as noted on the Drawings.
3. Inside flush floor boxes and other locations where indicated in the Contract Documents.
4. Low Voltage Outlets in Non-Fire Rated walls and ceilings
   a. Outlets for low voltage devices installed (recessed into) walls or ceilings, only where the wall/ceiling is not fire-rated.
   b. Provide the following for each outlet location
      1) Metal outlet box, enclosed type. At all locations where one or more conduit(s) are required to connect to the outlet, then only metal outlet box shall be provided.
5. Low Voltage outlet installed into accessible suspended ceiling with removable ceiling panels.
   a. Support outlet independent of ceiling supports and ceiling.
   b. Provide a minimum of three independent hanger wires for each outlet. Attach hanger wires to building structure above ceiling and to outlet.

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2.11 PORTABLE PATCH CORDS

A. General
1. Provide portable patch cords for all copper wire and fiber optic cable infrastructure outlets:
   a. For interconnecting wall outlets to work-station computers.
   b. For interconnecting patch panel outlets at MDF rack to hubs, switches, routers, telephone equipment, and paging equipment.
2. Patch cords shall be factory assembled tested and certified with factory terminated plugs at each end. Field terminated portable patch cords shall not be permitted. Terminated plugs shall incorporate integral bending radius limiting molded “boots” and strain relief. Patch cord assemblies shall be rated for "heavy duty", “high-abuse” service.

3. Patch cords shall be UL listed, complying with CEC – California Electrical Code, ETL tested and certified to comply with or exceed Specified Requirements. ANSI/T1A 568C related Standards, Addendums and TSB.
   a. CEC - OFNG/OFN for fiber optic portable patch cords.
   b. CEC - MPP/CMP/CMR/CMG/MPG for copper wire twisted pair portable patch cords.
4. Patch cords which are not installed shall be delivered to the Owner in cardboard boxes. The patch cords shall be neatly bundled and tied together. Mark each box with quantity and type of cords contained in the box.
5. Patch cords shall comply with the same Cable Communication Performance Requirements, Protocol Requirements and Testing Requirements as the respective infrastructure cables and outlets to which the patch cords are intended to be connected (plug-in). Patch cords shall be the product of the same Manufacturer.
6. The outer jacket of each portable patch cord shall be imprinted with date, Manufacturer's model and catalog number, and AHJ listing identification.
7. Provide a permanent, visible, factory applied identification number on each end of each patch cord. The identification number shall be the same on each end. However, the numbers shall increase sequentially on each patch cord and shall be unique and not duplicated on other patch cords. Permanently apply the identification numbers on the cable jacket or connectors.

B. Fiber optic cable patch cords
   1. Provide three duplex single mode patch cords and three multimode duplex patch cords at the MDF rack. Cords shall be 4-feet in length.

C. Copper Wire Portable Patch Cords
   1. Twisted Pairs portable patch cords, general:
      a. "Male" eight positions modular RJ" male style jacks install on each end of the patch cord cable. The jack shall be provided with a rear "fin" to prevent the plug tab from snagging when pulled backwards through adjacent wiring.
         RJ-45 style "male" jack, typical unless noted otherwise.
      b. Patch cord cable shall be UTP ANSI-Category 6A rating, shall match respective premise wiring, 4-pair twisted, stranded copper individually insulated wires, thermoplastic jacket over all the wires.
      c. Connectors shall comply with FCC 68.5 and Part 68 Subpart F.
      d. Connectors UL listed and shall comply with UL-94V-O.
      t. Cable jacket color shall be yellow.
   2. Portable patch cord quantities and lengths as follows:
      a. Provide one complete patch cord assembly for each indoor wall mounted Cat 6e connector, lengths as follows:
         1) 6-feet long - 50% of total quantity
         2) 8-feet long - 50% of total quantity
      b. Provide one complete patch cord assembly for each rack mounted copper outlet in patch panels at the MDF, lengths as follows:
         1) 2-feet long - 25% of total quantity
         2) 4-feet long - 50% of total quantity
         3) 6-feet long - 25% of total quantity

2.12 TERMINATION OF 25-PAIR CABLES

Termination facilities for each end of Cat 5 multi-pair cables connecting MDF and main telephone backboard shall be UL Listed, rated Cat5e, 25-pair, 66 cross-connect blocks, no cover. Hubbell #HPW66M125 series or equal with #S89 standoff brackets.

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PART 3 - EXECUTION

3.1 STRUCTURED CABLE TESTING AND COMMISSIONING (ADDITIONAL REQUIREMENTS)

A. General

1. In addition to the testing recommended in ANSI/TIA-568C and related Standards, Amendments and TSB. End-to-End test 100% of all individual optical fiber, individual copper wire conductors, each outlet and each connector in all terminated and unterminated cables, portable patch cord, outlets and patch panels provided in the
2. The test equipment and (Tester) shall comply with the Accuracy Requirements for Field Testers as defined in the ANSI/TIA Standards for the specific cable type. The Tester including the appropriate interface adapter shall meet the specified Accuracy Requirements. The Tester shall be within the calibration period recommended by the Vendor to achieve the vendor-specified measurement accuracy. The Tester shall be calibrated to extend the reference plane of the Return Loss measurement to the permanent link interface. If requested, the Contractor shall provide proof that the interface has been calibrated within the period recommended by the Vendor.
3. The Pass or Fail condition for the channel pathway link-under-test is determined by the results of the required individual tests (ANSI/TIA) any Fail result yields a Fail for the link-under-test. To achieve an overall Pass condition, the results for each individual test parameter must Pass.
4. Provide all Test Equipment, Certified Testing Personnel, and setups. Shall comply with ANSI/TIA and Equipment Manufacturer's recommendations and Standards of Practice.
5. The Contractor shall repair or replace equipment, cables, outlets, connectors, splices, terminations, etc. identified during testing as not complying with the Contract Documents, without additional cost to the Contract. Retest all replaced or repaired components at Contractor's expense.

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3.2 CABLE INSTALLATION

A. General

1. Cables connecting to equipment racks and terminal blocks shall be installed with not less than 6-feet of slack cable between the equipment rack/terminal block and terminal back board. The slack cable shall be coiled and supported on the backboard and/or cable tray.
2. Cables in terminal closets and terminal rooms shall be trained, dressed and racked on the plywood backboards. Provide cable, metal support arms and re-enterable type cable support rings not less than 12-inches on center mounted onto the plywood along the entire length of all cables.
3. Provide separate routing paths on plywood backboards for fiber optic cables, computer data and copper wire cables and telephone/voice copper wire cables and multimedia, audio/ video, TV cables. Provide separate routing paths on plywood backboards for shielded copper wire cables and unshielded copper wire cables.
4. Cables shall be routed parallel to floors and walls. Do not route cables diagonally on backboards.
5. Provide cables installed from workstation outlets to respective MDF rack continuous without cutting or splices.

B. Cable Installation:

1. Minimum bending radius and maximum pulling tension of fiber optic cables shall not exceed the cable manufacturer's recommendations.
3. The minimum bending radius for copper wire cables shall be ten times the cable outside diameter. The maximum pulling tension and minimum bending radius shall not violate Manufacturer's recommendations.

4. Cables shall be pulled in a continuous, smooth operation without jerking or stop-start motion after initiation of pull.
5. Where cable tray is provided, all cables shall be routed and trained on the cable tray. The cables shall enter the cable tray and route along the tray prior to entering any equipment racks or computer works station outlets.
6. The portions of cables installed without raceways or cable tray supports shall be installed with metal "J-hook" cable supports.
   a. The "J-hooks" shall provide multi-tiered "J" shaped hooks, with wide flat cable support base (0.5 inch wide minimum) and smooth rounded corners. Specifically designed for copper wire and fiber optic infrastructure cable support as manufactured by Erico Inc.
   b. The individual "J-hook" attachment to the building structure shall be metal, "beam clamp", "hanger rod", clevis hanger styles as applicable for each attachment location.
   c. Install "J-hooks" not more than 48-inches on center along the entire cable length and within 6 inches of each cable change in direction. Locations of "J-Hooks" and tension of cables shall insure between 4-inches and 6-inches of cable sag between adjacent hooks. Secure cables to "J-hooks" with re-enterable cable tie wraps. "J-hook" supported cables, bundle cables together with re-enterable tie wraps not less than 12-inches on center along the entire cable length.
   d. Each J-hook shall not support more than twelve individual cables. Provide multiple "tiered" J-hooks for additional cable quantities at each location.
   e. "Bridle rings" shall NOT be used to support cables.
   f. Cables shall not lie directly on nor attach to ceilings, ceiling hangers, lighting fixtures, air ducts, piping, or equipment.
7. Re-enterable cable tie wraps shall be: "limited-combustible" and air plenum rated, reusable, color-coded. Chemically and mechanically compatible with the respective cables and installation locations. Shall allow multiple open-close operations for securing cables.
8. Electronic network cables containing non-dielectric components shall be installed with a minimum separation from other electrical power conductors and equipment as follows:

	Equipment Type	Minimum Separation
a.	Lighting fixtures	12 inches
b.	Electric motors, electric solenoids, electric Heaters	40 inches
c.	Transformers	48 inches
d.	Circuits over 100 volts to ground, in metallic raceways	5 inches
e.	Circuits over 100 volts to ground, in non-metallic raceway or without any raceway	12 inches
f.	Circuits over 100 volts to ground, suspended on overhead pole lines	48 inches

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3.3 CABLE SPLICES

A. General
   1. Splice(s) in cables shall occur only at equipment racks.
   2. Polarity and color-coding shall be maintained consistently through splices, terminations, and outlets for the entire electronic network system.

B. Fiber optic cable splices unless specifically indicated otherwise below fiber optic cable splices between fiber optic cable-fibers shall be fusion type splices.

3.4 CABLE TERMINATIONS

A. General

1. Infrastructure workstation outlets connecting to ports in patch panels and terminal blocks shall be grouped together in the patch panel and terminal block by room location. Each cover plate shall be identified with engraved (etched) nameplates indicating identification and port numbers.
2. Polarity and color-coding of cable connections at splices, terminations, and outlets shall be consistently maintained throughout the entire electronic network system.
3. Terminate all cables onto respective outlets connectors, interconnection couplers and terminals. Terminations shall comply with Manufacturer's recommendations, ANSI/TIA-568C related Standards, Amendments, and TSB.
4. Fiber optic cable fiber strands and copper wire cable conductors terminated at outlet locations shall be connected with a strain relief device attached to the cable jacket to prevent cable tension from being transmitted to the termination connectors.
5. Cable terminations shall be performed to maintain the data transmission rates specified for respective entire system.

B. Fiber Optic Terminations

1. Individual fiber optic fibers shall each be terminated with a fiber optic fiber connector. The connector for each fiber shall be "plugged" into separate fiber optic fiber inter-connection couplers on the rear of each respective outlet.
2. Each fiber optic termination ferrule shall be inspected, after completion of the termination, visually with a fiber optic inspection microscope and an interferometer, to insure fiber “undercut”, “protruding” fiber, over polish and under polish of fiber termination ends does not exist in the finished termination ferrule.
3. Fiber optic cables terminated between two fiber optic patch panels located in separate equipment racks. The fibers shall be paired together (Duplex-Pair) for purposes of identification and connection transmit/receive pair. Each pair of connectors for fibers shall be "plugged" into separate, physically adjacent fiber optic fiber duplex-pair inter-connection couplers at each patch panel. The horizontal/vertical arrangement of paired patch panel fiber couplers shall match at both ends of the fiber cable.
4. Fiber optic cable fiber strands terminated at patch panels shall be installed with a minimum of 540 degrees of each fiber strand looped around the splice tray individual fiber “training” rings.

C. Copper Wire Terminations

1. Cat 6e twisted wire pairs shall not be untwisted for a length of more than 0.4 inches at any location and the cable jacket shall not be striped back not more than 0.5 inches at any location including splices and terminations.
3. Unless specifically directed otherwise by the Owner's Representative, Pin assignment for Cat 6e wiring terminations shall comply with ANSI/TIA 568C type T568A or Type T568B as required for compatibility with the electronic network equipment. The termination type shall be consistent throughout the Project Contract area.
4. Copper wire terminations shall be performed to maintain the transmission rates specified for the respective entire system.

3.5 EQUIPMENT RACKS

A. General

1. Install, assemble, mount and connect devices and equipment in the respective equipment racks, bolted securely to the rack frame with stainless steel hardware. "Star" style lock washers shall be provided to ensure an electrically continuous ground path between the equipment/devices and rack frames.

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2. Provide blank metal filler panels to close unused equipment "front" mounting space in equipment racks, Manufacturer's standard finish color.
3. Provide a copper wire outlet connector in the respective equipment rack for each remote copper wire infrastructure workstation outlet and copper wire cable shown connected to the respective equipment rack, plus the spare copper wire outlet connectors required in the Contract Documents. The copper wire outlet connectors in the equipment racks shall be provided in equipment rack mounted copper wire patch panels. In no case shall the quantity of equipment rack mounted copper wire outlet connectors be less than the quantity of cables indicated on the Drawings, plus required spaces/spares.
4. Provide fiber optic fiber connectors and fiber optic fiber interconnection couplers in the respective equipment rack for each remote fiber optic infrastructure workstation outlet, and fiber optics cable fiber shown connected to the respective equipment rack. The fiber optic fiber connectors and fiber optic fiber interconnection couplers in the equipment racks shall be provided in equipment rack mounted fiber optic fiber distribution enclosures (RTDE) in no case shall the quantity of equipment rack mounted fiber optic fiber connectors and fiber optic fiber interconnection couplers be less than the quantity of cables indicated on the Drawings, plus required spaces/spares.
5. Terminal racks, equipment locations, patch panels, and cross connects shall be arranged to allow for natural cabling progression, minimize crossing of cables and allow easy access to each system component.

B. Floor Standing Equipment Racks
1. General:
   a. Securely anchor racks to floor.
   b. All incoming cables shall enter through the top or bottom of the racks.
   c. The front of the racks shall maintain a minimum of 42-inches of clear working space.
   e. Cables entering racks shall enter into the top of the rack from overhead cable tray or from wall along wall support arms to rack.
2. Floor standing open frame equipment racks.
   a. The rear of the rack shall maintain a minimum of 30-inches clear working space behind the rack frame rails for adequate installation depth of HUBS/switches equipment, for "walk" behind access to equipment and for cable terminations access.

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3.6 MDF CIRCUIT TERMINAL ROOMS AND CLOSETS

A. Terminal Backboard
1. Provide 0.709-inch-thick sanded plywood backboard in the MDF room on the wall next to the rack. Plywood shall extend continuously from the finish floor to 8 feet above the finish floor. Sanded side of plywood shall face the interior of the room.
2. Attach plywood to wall structural framing with mechanical fasteners a minimum 6-inches on center vertically on walls at each framing vertical member, and along the length of the wall, but not less than 16 inches on center horizontally along the length of the wall.
3. Paint plywood terminal backboards after installation and prior to mounting any equipment. One coat of fire-resistant primer and two coats of fire resistant/ intumescent, non-conductive paint. Finish color matte/flat white.

B. Cable Tray
1. Provide a horizontal cable tray above the equipment rack.
2. Ladder type cable tray 18-inches wide by 6-inches deep; length-end wall to end wall, of the room.
3. Install the cable tray centered above the MDF rack, not less than 12-inches above the top of the rack.

C. Conductor Training and Support
   1. Provide conductor/cable training and racking support distribution rings installed on backboards. As manufactured by Newton 3042 Series, Saunders or equal.
   2. Support rings shall be spaced a minimum of 10-inches on center along all cable/ conductor routing paths on backboards and within 4-inches of each change in cable/ conductor direction.
   3. The capacity of support rings shall be equal to the weight and quantity of conductors/ cables passing through the respective support ring plus 100% spare capacity for installation future conductors/cables. In no case shall support rings be smaller than 3 inches.
   4. Attach support rings to backboards with not less than two ⅜-inch diameter by 1⅛-inch long threaded wood anchor bolts for each individual bracket.

3.7 GROUND (ADDITIONAL REQUIREMENTS)

A. Provide #6AWG copper ground wire in ¾-inchC. from ground bus in MDF rack to ground bus of Panel P2 in same room.

B. Equipment Racks:
   1. Provide a separate 12AWG copper stranded green insulated ground conductor from each individual equipment element in the rack to the respective rack ground bus.
   2. Provide a 1#10 AWG copper insulated ground conductor connecting to cable tray and metal support equipment located in the MDF room.

3.8 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. General
   1. Fiber optic and copper wire cables shall be identified in each patch panel and computer workstation outlet.
   2. Infrastructure documentation, identification labels and color coding shall comply with ANSI/TIA-606A Administration Standard for Telecommunications Infrastructures, Class-1 through Class-4. Provide management software MS-Windows-based single user license, with all as-built data entry documentation information complete.

B. Equipment and Outlet Naming Identification and color-coding shall comply with ANSI/TIA latest revision.

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END OF SECTION 27 20 00

SECTION 27 41 10 – AUTONOMOUS AUDIO SYSTEM

PART 1 - GENERAL

1.1 SCOPE OF WORK:

A. Work Included: All labor, materials, appliances, tools, equipment, facilities, transportation and services necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Sections for work related to those other Sections and required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

B. Provide two complete and independent audio systems as described herein at locations indicated on Plans.

1.2 RELATED WORK:

Documents affecting work of this Section include but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections of Divisions 1 and 26 of these Specifications.

A. The work described by this part includes the furnishing of all materials, equipment, supplies, labor and the performing of all operations necessary for the installation of complete and operating systems.

B. All conduits, outlet boxes, back boxes, junction boxes, terminal cabinets and backboards are furnished and installed by others and not part of this Section. The wiring, cables, equipment, devices, etc., shall be furnished and installed completely under this Section. Conduit and junction box sizes shall be determined by the Installing Communications Contractor for the particular wire and cable fills required for the systems installed (conduit sizes shall comply with the National Electrical Code).

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C. The Installing Communications Contractor shall furnish and install all equipment, cables, devices, and other materials even though not specifically mentioned herein, which are necessary for the proper integration of the system so that the system shall perform the functions listed herein in compliance with all Specified Requirements.

1.3 GENERAL REQUIREMENTS

The Installing Communications Contractor shall be a Factory Authorized Distributor and warrantee station for the brand of equipment specified and shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment.

1.4 QUALITY ASSURANCE:

A. Electrical Component Standard: Provide work complying with applicable Requirements of NFPA 70 "National Electrical Code" including, but not limited to:
   1. Article 250, Grounding.
   2. Article 300, Part A. Wiring Method.
   3. Article 310, Conductors for General Wiring.
   4. Article 725, Remote Control, Signaling Circuits.
   5. Article 800, Communication Systems.

B. EIA Compliance: Comply with the following Electronics Industries Association Standards:
   1. Sound Systems, EIA-160.
   2. Loudspeakers, Dynamic Magnetic Structures, and Impedance, EIA-299-A.
   3. Racks, Panels, and Associated Equipment, EIA-310-A.

4. Amplifiers for Sound Equipment, SE-101-A.
5. Speakers for Sound Equipment, SE-103.

1.5 SUBMITTAL AND MANUALS (ADDITIONAL REQUIREMENTS)

A. General
   1. Submittal shall include installer qualifications.
   2. Submittal shall include a block diagram showing system components and interconnections.
   3. Submittal shall include manufacturer's product data sheets for all system components.

B. At the conclusion of the Project, the Contractor shall provide three copies of an "Operating and Servicing Manual" for the system. The manuals shall be bound in flexible binders. All data shall be printed material or typewritten. Each manual shall include the following: Instructions necessary for the proper operation and servicing of the system; complete As-Built Installation Drawings of the system; a wiring destination schedule for each circuit leaving for each piece of equipment; a schematic diagram of major components. Provide City with a PDF version of the Operating and Service Manual.

PART 2 - PRODUCTS

2.1 GENERAL

A. The system shall receive a wireless Bluetooth audio signal from an owner-furnished remote smartphone, computer, or other Bluetooth compatible device and broadcast it over the system speakers.
B. The system shall include a wireless microphone system for two wireless microphones.
C. The system shall include an assistive listening component to broadcast the audio program to wireless earbud receivers in the same room.
D. The system electronics shall be housed in a wall mounted lockable equipment rack.
E. The system shall include a wall mounted remote keyed switch for system on/off control, and a remote volume control.
F. The system shall include speakers distributed on the ceiling of the room as indicated on Plans.

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2.2 RACK MOUNTED EQUIPMENT

A. Provide wall mounting equipment rack equal to Atlas Sound #WMA Series or equal. Rack shall have hinged/locking front door, vented side panels, wire management, ground bus, 22-inches wide x 24-inches deep, height as required to contain all specified equipment.
B. Stereo Bluetooth audio receiver equal to Denon #DN-200BR with rack mounting bracket, power supply.
C. Single channel power amplifier rated 250watts, 70.7V output, 0.1%THD at rated power output, equal to Electrovoice #PA1250 Series, with rack mounting kit.
D. Audio level controller/limiter equal to Atlas #TSD-ALC2 Series with power supply and rack mounting kit.
E. Line mixer with remote level control equal to Atlas #TSD-RL21 Series with power supply and rack mounting kit.
F. Power conditioner and distribution unit equal to Atlas Sound #AP-S20.
G. Speaker to monitor system output, with volume control for the monitor.
H. Two-channel wireless microphone system including rack mounted receiver and power supply, remote antenna, and two microphones. Sennheiser #XSW 1-835 series with two #835 Handheld Microphones or equal.
I. Assistive listening system equal to Williams Sound #FM-457 Series with the following accessories:
   1. One PPA T45 Transmitter

2. Four PPA R37N Receivers
3. Four EAR 022 Surround Earphones
4. Two NKL 001 Neckloops
5. Four BAT 001-2 AA Alkaline Batteries
6. One ANT 025 Whip Antenna
7. One IDP 008 ADA Wall Plaque
8. One TFP 048 Power Supply
9. One WCA 013 RCA Audio Cable, 3 feet
10. One WLC 004 Main Power Cord (U.S.)

2.3 SPEAKERS

System speakers shall be Electrovoice #EVID C12.2 Series furnished in quantities indicated on Plans. Each speaker shall be furnished in a metal enclosure designed for the speaker to be recessed into the ceiling. Provide white enamel grille flush with ceiling. Speaker shall have 12-inch diameter coaxial transducer, internal bandpass filter, and line matching 64W transformer.

2.4 CABLE

A. Speaker cable shall be UL listed for Class 1 circuits as defined by NEC Article 725. West Penn #77295 #14AWG shielded or equal.
B. Provide cables to interconnect system components as recommended by the Manufacturers.

2.5 ACCESSORIES

A. Provide wall mounted system keyed on-off switch with pilot light connected to the power controller in the rack to remotely turn the system on and off.
B. Provide wall mounted remote level control knob on steel faceplate and connected to the rack mounted mixer.
C. Provide carrying case for portable equipment associated with the assistive listening system.
D. Provide covers over adjustment controls in rack to deter settings from being altered.

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PART 3 - EXECUTION

3.1 GENERAL

Position speakers to ceiling at approximate locations shown on Plans and adjusted for best performance. Set transformer taps to 16 watts. Adjust taps up or down during testing to achieve best results.

3.2 INSTALLATION

A. The wiring of the system shall be executed in accordance with the Drawings and the Equipment Manufacturer's Wiring Diagrams. Should any variations in these Requirements occur, the Contractor shall notify the architect before making any changes.
B. Furnish all conductors, equipment plugs, terminal strips, etc., and labor to install a complete and operable system.
C. The labor employed by the Contractor shall be regularly employed in the installation and repair of communication systems and shall be acceptable to the Owner and Architect to engage in the installation and service of this system. The systems shall be installed in accordance with NFPA 70 and other applicable Codes.
D. Control circuits shall be installed in accordance with Manufacturers recommendations. Provide number of conductors as recommended by System Manufacturer to provide control functions indicated or specified.

E. Grounding
   1. Provide equipment grounding connections for Integrated Electronic Communications Network systems as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.
   2. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize to the greatest extent possible ground loops, common mode returns, noise pickup, cross talk, and other impairments.

F. Wiring within Enclosures:
   1. Provide adequate length of conductors. Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars. The cables within the rack or cabinets shall be carefully cabled and laced with No. 12 Cord waxed linen lacing twine or ty-raps. All cables shall be numbered for identification.
   2. Splices, Taps, and Terminations: Make splices, taps and terminations on numbered terminal punch blocks in junction, pull, and outlet boxes, terminal cabinets and equipment enclosures. Splices of conductors in underground pull boxes is not permitted.
   3. Identification of Conductors and Cables: Use color coding of conductors and apply wire and cable marking tape to designate wires and cables so all media are identified in coordination with system wiring diagrams.

G. Adjust all rack mounted equipment and speaker taps for best sound.

3.3 TESTING AND TRAINING

A. Demonstrate proper operation of all equipment to the Project Inspector.
B. Provide 2-hour on-site training to District Personnel by Qualified Technicians to demonstrate system operation.
C. Provide typewritten instructions attached to the inside of the rack explain operation of the system.

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3.4 PROTECTION AND CLEANING

A. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the Manufacturer.
B. Repair or replace damaged components before substantial completion of the Project.
C. Remove temporary tags, coverings, and construction debris from interior and exterior surfaces of the equipment. Remove construction debris from equipment area and dispose of properly.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a duly Factory Authorized Service Representative for this Project location to supervise the field assembly and connection of components and the pre-testing, testing, and adjustment of the system.
B. Inspection: Make observations to verify that units and controls are properly labeled and interconnecting wires and terminals are identified. Provide a list of final tap settings of paging speaker line matching transformers.

3.6 WARRANTY

A. The entire system shall be warranted free of mechanical or electrical defects for a period of 1-year after final acceptance of the installation. Any material showing mechanical or electrical defects shall be replaced promptly at no expense to the Purchaser.
B. A typewritten notice shall be posted at the equipment rack which shall indicate the firm, address and telephone number to call when service is necessary. The notice shall be mounted in a neatly finished metal frame with a clear plastic window and securely attached to the inside of the door.

END OF SECTION 27 41 10
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SECTION 27 51 33 - LINE VOLTAGE OCCUPANCY MOTION SENSORS

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specification Sections and Drawings for related work required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

Submit Manufacturer's Data Sheets on sensors.

1.3 APPLICABLE STANDARDS (ADDITIONAL REQUIREMENTS)

A. General
   1. All ultrasonic sensors shall comply with the State of California Safety and Health Requirements. Decibel levels for ultrasonic sensors shall comply with the following criteria and the State of California Energy Commission for ultrasonic emissions:
   2. The Contractor and Manufacturer shall certify in writing that all proposed and installed occupancy motion sensors comply with the Federal Environmental Protection Agency (EPA) and State of California Energy Commission criteria.
   3. Occupancy motion sensors shall be:
      a. UL listed and labeled.
      b. Certified for compliance with Federal-EPA and State of California Title-24 Energy Commission Requirements.

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PART 2 - PRODUCTS

2.1 MOTION SENSORS

A. General
   1. Motion sensors and power supply shall be self-contained. The motion sensors shall be solid state low voltage devices designed specifically for energy conservation lighting control. Combined dual function ultrasonic and infrared motion sensing.
      a. Ultrasonic crystal controlled to within ±0.01% motion sensor technology.
      b. Passive Infrared (PIR) motion sensor technology.
   2. Occupancy motion sensor shall also include available ambient light sensor, in addition to the motion sensor. The ambient light sensor shall prevent the occupancy motion sensor from automatically turning "ON" the respective lighting when the ambient day lighting intensity detected by photoelectric cell contained in the motion sensor exceeds a selected intensity. The ambient light sensor circuit shall not control the automatic off function. The ambient lighting intensity detection sensitivity shall be adjustable in the sensor, adjustment range not less than 15 through 140-ambient day lighting footcandles.
   3. Automatic-off: sensor shall automatically turn "OFF" lighting when there is no movement after the preset time delay interval. Lights shall remain "on" with movement. There shall be a "dead band" time period after the unit turns itself off (because of lack of motion)

during which a new motion will automatically turn lights on without the manual switch having to be activated.

4. Automatic-on: Sensor shall automatically turn “ON” lighting when movement is detected in the monitored space. Lights shall remain on with movement. An internal control shall provide a mechanism to bypass the automatic-on control feature and allow only automatic-off functions. Where manual on/off dimming lighting control switches are shown on the Drawings, in addition to the occupancy motion sensors in the same space, the manual controls shall override the automatic "ON" control feature of the occupancy motion sensor. Override of the automatic "off" feature shall not be affected by the respective manual switches.
5. Motion detection sensitivity, time delays to turn “ON” after activation and time delays to turn “OFF”, shall be adjustable to ensure there will be no nuisance on/off switching of the lights by the motion sensor while the room is occupied. Adjustable settings shall be tamper-resistant, concealed behind an access protection cover.
6. Automatic self-adjusting Adaptive-Learning for time delay and sensitivity variable conditions in the monitored space.
7. Fail-to-on, the failure of a sensor shall cause the occupancy motion sensor load relay contacts to activate, so the occupancy motion sensor function is automatically by passed and lighting is turned-on.
8. All occupancy motion sensors shall be provided with an indicator light to display when motion is being detected and the unit is operating correctly.
9. Non-volatile internal memory shall store and maintain in memory all occupancy motion sensor settings during any electric power failure.
10. Where multiple occupancy motion sensors are installed with overlapping monitoring spaces, the sensors shall not cause false triggering or malfunctions to adjacent occupancy motion sensors.

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11. Occupancy motion sensors shall incorporate mechanical vibration-damping. The vibration damping shall prevent normal building vibrations from causing “False” sensor operation.
12. As manufactured by WattStopper; or Leviton; or equal.

B. Area Control Coverage

1. Space coverage of motion sensor transponder shall remain constant after sensitivity control has been set. No automatic reduction/increase in cover-age nor sensitivity shall occur when air motion caused by air conditioning or heating fans are in operation nor when the occupancy motion sensor has turned off lighting due to not detecting any motion.
2. Occupancy motion sensors in spaces 300-square feet area or less may be a wall switch mounted unit.
    a. Wall switch sensors shall provide detection of motion at desktop, for up to 300-square feet, 180-degree range within a volume dimension of up to approximately 20-feet by 15-feet by 10-feet high, extending from the wall mounting height of the unit to the finish floor.
    b. Wall switch occupancy motion sensors shall be a minimum load capacity of 500 watts 120V; 1000 watts 277V, but in no case shall the load rating be less than the lighting loads shown on the Drawings.
    c. Refer to Drawings for sensor locations and switching
        1) The wall motion sensor switch shall be supplemental control to the external manual control lighting wall switch(es) shown on the Drawings in the same room as the respective wall switch occupancy motion sensor.
        2) The wall motion sensor switch shall be provided in place of the manual control switch(es). Wall switch occupancy motion sensors shall be equipped with manual override internal switch accessible on the front of the enclosure

housing. The internal manual override switch shall turn "ON" the lights and turn "OFF" the lights when manually activated.

3. Motion sensors in spaces exceeding 300-square feet in size and where shown on the Drawing as mounted on the ceiling, shall be ceiling mounted. The sensor shall not protrude more than 1.6-inches below the ceiling line.
   a. Sensor area coverage shall be 360-degrees three-dimensional diameter surrounding the sensor installation location.
   b. The sensor shall be rated to provide coverage of the space volume/room length/ width/height shown in the Contract Documents. Provide additional ceiling mounted motion sensors to provide complete coverage of each area.
   c. Corridor/hallway sensor area coverage shall not be less than 80-linear feet extending from the sensor installation location. Sensor shall be bi-directional or unidirectional to provide complete area motion detection at the installation location shown on the Drawings.

2.2 CONTROL UNITS

A. General
1. Control unit shall be an integrated, self-contained unit consisting internally of load switching control relay(s), internal power supply and power supply transformer. The power supply shall be sufficient capacity to provide low-voltage power to a minimum of two motion sensors.
2. Occupancy motion sensors directly controlling line voltage electrical loads, the line voltage load relay contacts shall be “Dry” type electrically isolated, with load ratings as follows:
   a. 15A – 120-volt single phase 60Hz AC.
   b. 15A – 277-volt single phase 60Hz AC.
3. Load relay contacts shall be rated to control LED drivers up to the full ampere rating.
4. The quantity of individual internal load switching relays shall be not less than the quantity of individual “Switch-leg” circuits to be controlled shown on the Drawings.

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2.3 OCCUPANCY MOTION SENSOR HOUSING ENCLOSURE

A. General
1. Enclosures for occupancy motion sensor control units shall be pressed steel or high impact resistant nonflammable non-metallic enclosure. Enclosure finish color white. Semi-flush mounting installation, NEMA 1 “Dead Front” construction with mounting plates and barriers to provide separation between line voltage and low voltage wiring.

B. Mounting
1. Flush mounting 4.67-inches square by 2.125-inches deep outlet junction box with extension ring and occupancy motion sensor cover mounting plate.
2. Occupancy sensor shall be semi-flush mount into outlet box with tamper resistant attachment of the sensor and the outlet box.
3. Motion sensor shall be approved for installation in environmental air plenum.

PART 3 - EXECUTION

3.1 MOTION SENSOR QUANTITIES AND TYPES

A. General
1. The Contractor shall provide the quantity and types of motion sensors required for complete and proper volumetric coverage without gaps within the range of coverage(s) of controlled areas.

2. Rooms shall be 90% to 100% volumetric coverage of the sensing cover-age area, to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). Motion sensing detection coverage shall extend from the finish floor to not less than 48-inches above finish floor.
3. The locations and quantities of sensors shown on the Drawings are diagrammatic and indicate only rooms which are to be provided with sensors. The Contractor shall provide additional sensors if required to properly cover the respective rooms.
4. Ceiling mounted sensors shall also be pendant-mounted in rooms in which the controlled lighting fixtures are chain, cable, or pendant suspension mounted. The mounting height of the sensor shall be approximately 6-inches below the bottom of the light fixtures to be controlled.
5. Occupancy sensors may be affected by various conditions in the room. Make adjustments, change the location and/or type of occupancy motion sensor to obtain proper operation in each specific room location.
6. Install occupancy motion sensors a minimum of 72-inches horizontal distance from environmental air supply/return registers, fans and moving objects.

3.2 SETUP AND TESTING

A. Provide system programming and setup of all control sequences for lighting control system.
B. Adjust sensitively, time-delay, location and orientation of each occupancy motion sensor; test each sensor/control unit all in accordance with the Manufacturer's recommendations. Be certain that no obstructions block proper sensor coverage of detection areas and limit sensor pickup zone to the respective room.
C. Test all control system functions after the installation and connections are complete and the system has been energized. Verify each control sequence of operation and each device to be controlled are operating correctly.

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END OF SECTION 27 51 33
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SECTION 28 31 00 - INTRUSION DETECTION SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specifications Sections and Drawings for related work required to be included as work under Division 26.
   2. General Provisions and Requirements for electrical work.

1.2 QUALIFICATION OF BIDDERS AND EQUIPMENT

A. To qualify as an acceptable Bidder, whether the bid is submitted to the District, his Agent, a General Contractor or a Sub-Contractor, the System Bidder or Contractor shall be qualified Contractor and shall hold a valid License issued by the State of California Department of Consumer Affairs Collection and Investigation Services for the purpose of installing security systems. The System Bidder or Contractor shall hereinafter be referred to as the Contractor. The Contractor shall hold all other licenses required by the legally constituted Authorities Having Jurisdiction over the work. The Contractor shall be the Factory Authorized Distributor for the branch of equipment offered and shall have been engaged in the business of supplying and installing the specified type of system for at least 5-years. The Contractor shall maintain a fully equipped service organization capable of furnishing adequate repair service to the equipment. The Contractor shall be financially able to provide a performance bond covering the work and the guarantee described. The Contractor shall provide that bond if requested.

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B. The equipment specified herein is manufactured by Digital Monitoring Products (DMP).
C. The system shall be serviced by a field-supported 2-year warranty.
D. The Specification is based on the equipment of Manufacturers who have been approved by the District and the Manufacturers herein named shall be considered as meeting the Requirements of this Specification. For all items which are identified by part number and Manufacturer the Performance Specifications which are published in the most recent Manufacturer's data sheets available at the time of bidding this Project shall be applicable to the present work as though fully written out herein.
E. All equipment shall conform to all local applicable Codes and Ordinances and shall be listed by Underwriters Laboratories.
F. Installation Certification
   1. Work and material for cables, cable terminations and related components shall be performed by Certified Installers. The Installer shall be certified by the respective Product Manufacturers.
   2. The Manufacturers of the indicated work and material shall provide an Installer education/ training and certification program for the supplied products.
   3. The Installers performing the Contract Work for the indicated products shall have attended and successfully completed each of the respective Manufacturer's installation training education programs for the specified products.
   4. Submit Manufacturer's Certifications for each Installer performing the work. The submittal shall be approved prior to initiating any related Contract Work.
   5. Contract material installed, and work performed by Installers not complying with these Requirements shall be removed. Removal of work and material not in compliance with

these Requirements shall be done at the Contractor's expense, without any additional cost to the Contract and without any additional Contract completion due date extensions. New material and work required to replace the non-compiling removed work and material shall be provided at the Contractor's expense, without any additional cost to the Contract and without any additional Contract completion due date extensions.

1.3 PERFORMANCE REQUIREMENTS

A. Provide control panel, power supply, sensor devices, keypad, and interconnecting conduits, sleeves, pathways and cabling as required for a complete and operable system.
B. Provide motion sensors in rooms with exterior glass and/or doors and/or hatches, and as indicated on Plans.
C. Provide keypad as shown on Plans.
D. Provide all programming and reprogramming required for the system to be fully functional.

1.4 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit product data sheets for all switches, keypads, wiring devices, device plates, controllers, power supplies, cabinets, etc.
B. Submit Detailed Shop Diagrams including Dimensioned Plans, Elevations, Details, Schematic and Point-To-Point Wiring Diagrams and descriptive literature for all component parts and cabinets.

PART 2 - PRODUCTS

2.1 CONTROL PANEL

Digital Monitoring Products #XR550 series.

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2.2 ACCESSORIES

A. Motion Sensors shall be Bosch #DS9370 series, ceiling mounted.
B. Power supply/charger shall be Altronix #SMP3ET series with Genesis NP7-12 battery. Provide one assembly for each new building.
C. Keypad shall be DMP “Thinline” 4-zone, white housing, and proximity reader.
D. Cabling shall be as recommended by the Manufacturer for system operation. Cables run in conduit below grade shall be rated by the Cable Manufacturer for wet locations.

PART 3 - EXECUTION

3.1 CONNECTIONS

All connections throughout the system shall be soldered, crimped by means of AMP lugs, fastened with screw type terminals, made by spring tension clip "punch block" terminals or make by standard plugs and receptacles. Each wire twisted pair, or cable shall be tagged throughout the site with EZ Markers with the room number it serves. All conductors in terminal cabinets shall be carefully formed and harnessed in a workmanlike manner.

3.2 SYSTEM CABLING

All system cabling shall be installed in conduit except where wiring occurs above accessible ceilings. All wiring in walls shall be in conduit. All conduits shall be run concealed. Where architecture precludes concealed conduits, run conduits on top of beams or trusses and minimize the exposure to view.

3.3 CABLES INSTALLED WITHOUT RACEWAYS

The portions of cables installed without raceways or cable tray supports shall be installed with "j-hook" cable supports.

A. The "j-hooks" shall provide multi-tiered "j" shaped hooks, with wide flat cable support base (0.5-inch wire minimum) and smooth rounded corners, specifically designed for Category-5/6 cable and fiber optic cable support. As manufactured by Erico Inc.

B. The individual "j-hook" attachment to the building structure shall be "beam clamp", "hanger rod", clevis hanger styles.

C. Install "j-hooks" not more than 48-inches on center along the entire cable length, at each cable change in direction, to insure less than 6-inches of cable sag between adjacent hooks. Secure cables to "j-hooks" with cable tie wraps. "J-hook" supported cables, bundle cables together with tie wraps not less than 12-inches on center along the entire cable length.

D. Each J-hook shall not support more than twelve individual cables. Provide multiple "tiered" J-hooks for additional cable quantities at each location.

E. "Bridle rings" shall NOT be used to support cables.

F. Cables shall not lie directly on ceilings, ceiling hangers, lighting fixtures, air ducts, piping, or equipment.

3.4 MOTION SENSORS

Locate motion sensors to provide optimum coverage of the space and to avoid conflicts with the architectural aesthetics of the building. Submittal Drawings shall show the exact locations of all system sensors.

3.5 SYSTEM PROGRAMMING

Provide all system programming including the necessary product handlers so that all parameters are entered into the system and the annunciator displays a text, which is customized to the facility.

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3.6 SYSTEM TESTING AND DOCUMENTATION

Before the Contract shall be considered complete, the Contractor shall program the system per District Requirements and demonstrate the performance of the system in the presence of the City. The Contractor shall provide all test and reception gear required to prove the performance as outlined.

END OF SECTION 28 31 00

SECTION 28 46 20 - FIRE ALARM

PART 1 - GENERAL

1.1 SCOPE

A. Work Included: All labor, materials, appliances, tools, equipment necessary for and incidental to performing all operations in connection with furnishing, delivery, and installation of the work of this Section, complete, as shown on the Drawings and/or specified herein. Work includes, but is not necessarily limited to the following:
   1. Examine all other Specifications Sections and Drawings for related work required to be included as work under this Section.
   2. General Provisions and Requirements for electrical work.

B. Design/Build: The fire alarm system shall be designed and constructed by the contractor. The Contractor shall prepare detailed Fire Alarm Drawings in format acceptable to the City of Irvine Fire Department Plan Check. The Contractor shall submit the fire alarm Drawings to the County of Los Angeles Fire Department and County of Los Angeles Building and Safety Department and obtain approval and construction permits for the system.

1.2 SUBMITTALS (ADDITIONAL REQUIREMENTS)

A. Submit PDF copy of Fire Alarm Drawings showing the following:
   1. Floor Plans showing all components of the fire alarm system and interconnecting conduit and wire.
   2. Equipment schedule showing Manufacturer, model number, and CSFM listing number.
   3. Riser diagram, voltage drop calculations, and battery calculations.

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B. Submit Manufacturer's cut sheets for all fire alarm components, with specific model numbers and Power Requirements highlighted.

C. Submit Installer qualifications.

1.3 APPLICABLE STANDARDS (ADDITIONAL REQUIREMENTS)

A. General
   1. The equipment shall be listed, labeled, and approved for the application shown in the Contract Documents, as fire alarm equipment complying with the most recent versions of the Install Requirements of the following applicable Standards.

B. Installation and Testing Completion
   1. Equipment Manufacturer shall be submitted to the Owner’s Representative Certifying the installation has been tested, is operational and conforms to the Requirements of the Contract Documents, applicable Building Codes and AHJ.

1.4 EQUIPMENT QUALIFICATIONS

A. General
   1. All equipment shall be the products of Edwards, Notifier, Silent Knight, Fire Control Instruments, or equal.
   2. Fire alarm system items described by Manufacturer’s part number, shall comply with the Performance Specifications published by the Manufacturer’s most recent catalog data sheets at the time of bid date and shall become the Requirements of the Contract Documents.
   3. The Fire Alarm System Installation Company shall be an Authorized Distributor and Service Provider for the fire alarm system equipment specified in the Contract Documents and furnished as part of Contract Work. The Fire Alarm Installation Company shall be

certified, and their staff shall be trained for the fire alarm system equipment furnished as part of Contract Work. Provide documentation from the Fire Alarm System Manufacturer demonstrating compliance in good standing with the "Authorized Distributor," "Service Provider," "Certification" and "Training" Requirements.

4. A Fire Alarm System Technician authorized by the Manufacturer of the fire alarm system shall supervise the Contractors' installation, testing, certification and instruction of Owners' Personnel in the operation of the fire alarm system. The Technician shall be experienced with the specific system and licensed in the respective State for Fire Alarm Systems.

PART 2 - PRODUCTS

2.1 GENERAL SYSTEM OPERATION

A. Alarm Conditions

1. Actuation of any manual or automatic alarm initiating device connected to the fire alarm system shall cause the following automatic functions. The automatic functions and actions shall be selectable by fire alarm system software program control functions and shall comply with the AHJ Requirements.
2. Audio and visual alarm evacuation signaling units shall activate continuously. Provide evacuation alarm "Coded" signaling and zoning to comply with AHJ.
3. The respective zone alarm annunciator and annunciator displays on the fire alarm control panel, remote annunciator panels, and remote annunciation/monitoring equipment shall be activated.
4. Activate the central alarm system, offsite central station equipment interface and activate telephone/dialer monitoring lines.

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B. Trouble Condition

1. Actuation of any status or supervisory trouble condition connected to the fire alarm system shall be monitored and cause the following automatic functions:
   a. Activate the respective alarm zone trouble remote annunciator panels and annunciator display on the fire alarm control panel, remote annunciator panels and remote annunciation/monitoring equipment.
   b. Sound and audible trouble signal on the fire alarm control panel, remote annunciator panels, and remote annunciation/monitoring equipment.
   c. Activate the offsite central station trouble monitoring circuit.
2. Monitor and detect trouble/failure in any fire alarm systems electrical and electronic circuits, displays, operating software, communications devices, operator controls and equipment control devices.
3. Monitor and detect trouble that may prevent proper operation of any fire alarm initiating device/circuit, evacuation alarm device/circuit, communications device/circuit, control device/circuit etc., including breaks and/or shorts in circuits and display a trouble condition.
4. Each 120-volt AC electric power source connected to any fire alarm system component shall be monitored with indication by a "Power On" display annunciator. Upon normal source power outage, the system shall activate a power trouble condition display, and indicate a trouble condition.
5. Monitor the standby batteries and, upon a low battery condition or battery charging failure, activate the low battery display and indicate a trouble condition.
6. System ground detection shall be provided for the entire system. Upon ground detection, activate the ground detection display and indicate a trouble condition.

7. Smoke detector "Pre-Clean" pre-trouble condition and secondary "Dirty-Detector" trouble condition activate the respective detection display and indicate a trouble condition.

2.2 VOICE COMMUNICATION FIRE EVACUATION ALARM

A. General

1. Provide integrated audio/visual fire alarm one way voice evacuation, in combination with audible tone, alert/evacuation, and one way voice/ communications system through evacuation speakers, and visual evacuation strobes. The system shall operate not less than four simultaneous independent voice channels, Evacuation, Alert and Auxiliary channels. Provide both local from the fire alarm control panel and distributed amplification remote from the fire alarm control panel, to optimize system performance. The entire voice systems and audio/visual circuits shall be supervised by the fire alarm control panel. The system shall provide zoned audio/visual fire evacuation alarm signaling.
2. The audio sound fire alarm evacuation system shall provide a sound intensity of not less than 15dBA above average ambient sound intensities, and 10dBA above maximum ambient sound intensity occurring for 60 seconds. Ambient sound intensities shall be measured after the Owner has occupied the building spaces. In no case shall the sound intensity of the evacuation devices be less than 90dBA or greater than 120dBA when measured 10-feet horizontally from the device.
3. Voice Systems Sound Intensity and Intelligibility.
   a. Voice systems shall be audible, clear of distortion and intelligible, as defined in NFPA-72, IEC 60849 and 60268 and ANSI S3.2.
   b. The audio voice system shall provide a Common Intelligibility Scope (CIS) of not less than 0.8, or score Speech Transmission Index (STI) of not less than 0.7 STI, average in normally occupied building spaces.
   c. The Contractor shall provide additional work and materials to comply with these Requirements including but not limited to.
      1) Adjustment of system volumes and adjustment of audio-frequency audio frequency equalization.
      2) Adjustment location of speakers and respective circuits.
      3) Provide additional audio preamplifiers, audio amplifiers, additional speakers and additional speaker circuits.
   d. The additional work and material shall be included in the Contractor's Scope of Work Contract-price. Shall be shown on submittal information.

B. Preamplifiers and Amplifiers

1. Voice system preamplifiers and amplifiers shall be solid state continuous duty:
   a. Electronic amplification for audio alarm evacuation speaker circuits.
   b. All amplifiers and preamplifiers shall be identical, respectively interchangeable and of the same Manufacturer as the fire alarm control panel.
   c. Auxiliary output rated at 4-amp 24 Volt D.C. for operation of visual signaling evacuation alarm devices.
   d. Quantity of amplifiers and preamplifiers shall be sufficient to supply not less than a continuous 2-watt audio signal to each and every audio speaker connected to the fire alarm system, but in no case less than required for specified sound intensities plus specified spare capacity for future expansion.
   e. The voice evacuation amplifiers shall operate in a "sleep" mode to reduce electric energy consumption and automatically return to full rated output during a fire evacuation alarm condition.
2. Amplifier spare-capacity. Each preamplifier and amplifier shall be loaded to not more than 70% of specified output capacity, to allow for future expansion and possible changes in speaker watt "tap" settings.

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3. Pre-amplifier shall provide audio master control for all voice evacuation related functions. Automatic gain control to provide low distortion voice announcements and tone generator evacuation signals. The quantity and output of the preamplifier shall be sufficient to drive all audio amplifiers to specified maximum output with not more than 5% total system "end-to-end" (including speakers) audio distortion in the described voice frequency range. The preamplifier shall provide individual separate source pre-amplification, volume controls, and tone controls for each separate input source including Firefighter's microphones, tone generators, prerecorded voice messages etc.

C. Tone Generator
1. Shall provide alert and evacuation signal audio tones. The generated tones shall be selectable by the fire alarm system software program control functions as follows:
   a. Slow Woop (ascending or descending audio frequency).
   b. "900Hz tone" steady and/or "chime" providing selection of the following tone/ chime characteristics:
      Temporal Coded 3; State of California Code; Zone Code; or 4-4-4.
   c. Hi/Lo alternating tone frequency.
   d. Siren variable wail.
   e. 520Hz square wave
2. The tone shall automatically precede prerecorded voice messages and shall be manually controllable by Firefighter's override from the fire alarm control panel.

D. Pre-Recorded Voice Evacuation
1. Provide digital processing/conversion storage of prerecorded voice recording and storage of evacuation messages, minimum 15-minutes of messages. The prerecorded voice evacuation system shall also include the desired tone generator signal alert/evacuation with ten tones, in combination with the voice announcements. The pre-recorded information "playback" shall be selectable in any combination or individual sequence by the fire alarm system software program control functions, for each zone and by Fire-Fighter's manual override controls. The messages shall be stored in non-volatile memory to prevent the loss of the messages as a result of power failure.
2. The Firefighter's voice microphone module shall provide recording input for storage of voice evacuation announcements.
3. Provide an additional input port for a portable device to download pre-recorded evacuation announcements into the system.

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2.3 EVACUATION ALARM DEVICES

A. General
1. Evacuation alarm devices shall activate automatically from the control panel. Devices shall operate on a Class "A", 4-wire (Class "B", 2-wire) supervised alarm evacuation circuit. Series wired alarm devices shall not be used.
2. Screw type terminals with numbered identification shall be provided for "IN-OUT" connections of the alarm circuit wiring.
3. Devices shall be installed in a metal box, 3.9-inch-deep maximum, flush mounting unless indicated otherwise on the Drawings. Provide extension ring to increase the box depth, on the mounting box, if additional depth is required to accommodate the evacuation alarm device. Size as required for the audible alarm indicating device and wiring connections. Provide a trim ring and metal grill cover assembly. Cover assembly shall be a minimum of 0.062-inch-thick flat stainless steel or aluminum. Finish color of cover "Red" unless selected otherwise by Owner's Representative. The word "FIRE" shall appear on the grill, minimum 0.5-inch-high letters. The grill shall be screw attached to the box. The grill shall be square/rectangular shape for wall mounted evacuation devices and round for ceiling mounted evacuation alarm devices.

4. A visual alarm indicating device shall be an integral part of the audible alarm box cover assembly, for wall mounted and ceiling mounted devices. Each audible evacuation alarm device shall incorporate an integral visual alarm indicator unless indicated otherwise on the Drawings.
5. Alarm initiating devices, audible evacuation alarm device and visual evacuation alarm devices shall each be connected to separate circuits and conductors. Do not connect these devices to the same circuit conductors. The separate audible evacuation circuits shall provide Coded or Non-Coded audible signaling independent of the visual evacuation alarms.
6. The audio sound fire alarm evacuation system shall provide a sound intensity of not less than 20dBA above average ambient sound intensities, and 5dBA above maximum ambient sound intensity occurring for 60 seconds. Ambient sound intensities shall be measured after the Owner has occupied the building spaces. In no case shall the sound intensity of the evacuation devices be less than 90dBA or greater than 120dBA when measured 10-feet horizontally from the device.

B. Audible Evacuation Alarms
1. Voice speakers:
   a. Fire retardant, moisture/humidity resistant construction for both audible voice and tone notification of fire evacuation alarms, UL-1480 listed.
   b. Audio speaker input transformer, multiple transformer wattage settings to allow speaker wattage selection. Not less than four taps, one tap at low rating, one tap at high rating and two intermediate tap ratings. Input voltage rating to match respective circuit amplifier output rating. Speaker output circuit to match respective speaker impedance. Install inside the speaker housing.
   c. Metal, 6-inch nominal depth speaker housing flush ceiling installation locations, and metal 4-inch nominal depth on semi-flush wall installation locations. Housing interior shall be lined with sound dampening fire resistive material. Tamper resistant, removable, sound-transparent speaker cover grill. Red grill finish color or colors selected by Architect.

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C. Visual Evacuation Alarm Indicator
1. Lamp/Strobe internally illuminated projecting lens assembly, with flasher system. Unit shall flash on and off to provide visual indicating of fire alarm.
2. The word "FIRE" shall appear on the lens or lens plate. The lens shall project beyond the face of the cover assembly.
3. All visual evacuation alarm devices with a common evacuation alarm zone shall “Flash” in full synchronized unison or in random pattern, soft-ware programmable from the fire alarm control panel. The synchronized visual evacuation alarm devices shall not “Drift” out of synchronization at any time during operation.
4. The flash rate shall be software programmable from the fire alarm control panel for 1-3 flashes per second, with approximately 0.001 second flash duration.
5. Flash rate independent of audible device coded signal output.
6. Light source, Xenon high intensity flash strobe tube white/clear color, for Fire Alarm.
7. 75 candelas (cd) minimum, 180 candelas maximum flash intensity, at 10 feet distance along the direct line perpendicular axis viewing angle. The “Effective Intensity” of each flash shall not be less than 30 candelas from any viewing angle, but under any condition not less than required by AHJ. The flash intensity shall be “Field” adjustable over the specified range.
8. Photosensitive induced epilepsy:
   Wherever three or more multiple visual evacuation alarm devices are visible from any single location, the devices shall be adjusted to reduce the risk of inducing photosensitive

epilepsy seizure responses in susceptible people, using one or more of the following methods:

a. Synchronizing the flash rate.
b. Adjust the flash intensity.
c. Adjust the physical location of the visual device.
d. Devices installed closer than 55 feet distance “Sight-Line” together shall be synchronized flash rate.

PART 3 - EXECUTION

3.1 FIRE ALARM SYSTEM CONFIGURATION

A. Fire Alarm System Survivability

1. The fire alarm system equipment, wiring/cables, alarm initiation, alarm evacuation and zoning shall be configured, supplied and installed so a single point failure and/or fire damage condition does not contribute to the disruption of the operation of the entire fire alarm system. The undam-aged portions of the fire alarm system will continue to operate during a fire.
2. Separate and isolated routing paths through the building shall be provided for fire alarm circuits to avoid total loss of fire alarm system communications resulting from failure and/or fire damage, for both lateral/horizontal distribution communication paths on each floor and vertical riser communication paths in multi-story building.
3. Quantities and arrangements of components contained in fire alarm equipment shall ensure no single individual component failure will cause a failure of the equipment to provide the continued operation of the fire alarm system.

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3.2 IDENTIFICATION (ADDITIONAL REQUIREMENTS)

A. General

1. The inside cover of alarm initiating devices and communicating devices shall be marked with the zone initiating number communications identification address corresponding to the zone number in the respective control panel. Marking shall be with a felt-tip pen or permanent label.

3.3 TESTING

A. General

1. Program the fire alarm control panel as required to serve the new construction. All new portions of the fire alarm system shall be tested after the installation and software programming is complete.
2. Individually activate each manual initiating station and verify correct alarm operation and control panel response, and remote equipment operation.
3. Individually test each automatic initiating device and verify correct alarm operation, control panel response and remote equipment operation.
4. The fire alarm system installation and operation shall be verified by the Manufacturer’s Representative and a Written Manufacturer’s Verification Certificate delivered to the Owner’s Representative.
5. Individually operate each control function.
6. Test the battery back-up systems by disconnecting the incoming normal power and allowing the alarm system to operate 24 hours on battery power. Sound the alarm system for the specified reserve operation minutes at the end of 24 hours on battery power.
7. Fire alarm initiating devices: Test and verify each individual device with walk-around initiation, supervisory trouble test, and device missing test. Document each device type

and address, physical location; activate/reset response time and sensitivity. Also activate each manual test button and automatic test sequence.

a. Each fire smoke detector, activation test with UL listed aerosol "Canned-Smoke".
b. Each fire heat detector activation test with "Heat-Gun", heat rate-of-rise, and temperature set point.
c. Water flow, pressure sensor, fire suppression system and tamper, simulate activation alarm initiation. Do not cause actual discharge of fire sprinklers or discharge of fire suppression systems, as part of fire alarm system testing procedures.

8. Fire alarm evacuation devices: When the fire alarm system evacuation alarms are initiated, confirm each evacuation device location functions correctly. Document each device type and address, physical location, sound level intensity (audibility and intelligibility) for audible devices in each room with and without devices), visual (direct and indirect) intensity for visual devices, and activate/reset response time:
   a. Central Station monitoring notification and response occurs.

B. Audio Voice and Intelligibility Testing

1. The preamplifiers, amplifiers and speakers' sound levels and intelligibility shall be tested to ensure that the system meets the intelligibility standards for Life-Safety evacuation and notification systems.
2. The sound from the speakers shall be a minimum of 15dB above the ambient noise level throughout the facility. Testing shall be done with a Sound Level Meter or an Audio Analyzer.
3. Test the intelligibility of the speakers throughout the facility to ensure that the intelligibility meets the Requirements of the NFPA-72. The test shall be performed with an Audio Intelligibility Analyzer such as a Goldline DSP-30B or the Quest Technologies Sound Pro SE/DL.
4. Areas of the building where occupants are not expected to be normally present shall be permitted to have a CIS score less than 0.8 if occupant can determine that a voice signal is being broadcast and they must walk no more than 10m (35-feet) to a location with a CIS score of at least 0.8. Areas including but not limited to:
   a. Janitor closets
   b. Storage rooms
   c. Individual enclosed offices with two people or less occupancy and the office is smaller than 110 square feet floor space.

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C. Documents and Performance

1. Perform all electrical and mechanical tests required by the Equipment Manufacturer's certification form. Measure and adjust each automatic detection detector to the maximum stable sensitivity setting. Detector tests shall be performed with the detector at its operational location and under normal operational environmental conditions in the area. Bench settings are not acceptable. An operational check-out test and report shall be performed. Submit six copies of test report results. The tests and report shall include, but not be limited to:
   a. A complete list of equipment installed and wired.
   b. Indication that all equipment is properly installed and functions and conforms with these Specifications.
   c. Test of each individual zone as applicable.
   d. Serial numbers, locations by zone and model number for each installed detector.
   e. Voltage (sensitivity) settings for each ionization and photoelectric detector as measured in place with the HVAC system operating.
   f. Response time on thermostats and flame detectors (if used).
   g. Technician's name, certificate number and date.

h. The completed manual and automatic monitoring and control system shall be tested to ensure that it is operating properly. This test will consist of exposing the installed units to a standard fire test.

D. Acceptance Demonstration
1. Acceptance of the system shall also require a demonstration of the stability of the system. This shall be adequately demonstrated if the system operates continuously for a 90-day test period without any unwarranted alarms. In the event an unwarranted alarm(s) occurs, the Contractor shall repair, readjust or replace the defective equipment and detector(s) with new equipment and begin another 90-day test period. The Contractor shall recheck the equipment and detectors using the fire test after each readjustment or replacement of equipment and/or detectors.
2. Testing verification cycle shall be continuously repeated until the system successfully completes the testing. The test period shall not start until the Owner has obtained beneficial use of the building areas under tests.

E. After the Testing has been completed to the satisfaction of CFC 907.9 – 907.9.4.1 the Inspectors, provide the NFPA Certificate of Compliance to the Owner, the Local Fire Official, and the Architect.

3.4 DETECTOR COMMISSIONING

A. The detector shall incorporate a push button to invoke self-learning modes to simplify Commissioning including:
1. A learning mode that determines the reference flow (normalized flow) based on environmentally induced flow changes during the Com-missioning process.
2. Additionally, there shall be provision for a PC software tool to configure all user modifiable parameters of all system devices.

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B. Commissioning Tests
1. All necessary instrumentation, equipment, materials and labor shall be provided by the Contractor.
2. The Contractor shall record all tests and system configuration to establish “Baseline Data” and a copy of these results shall be retained on site in the System Logbook as a part of required system documentation.
3. System Checks
a. Visually check all sampling tubes and sampling points to ensure that layout complies with the Specification.
b. Connect power.
c. Connect VSC to USB / Ethernet port as per instructions in the product guide.
d. Wait 15 minutes for pump to warm up.
e. In Xtralis VSC configure the number of sampling tubes in use and maximum tube length.
f. Execute Normalization via Xtralis VSC. Note the detector will not normalize until 15 minutes after powering up.
g. Execute sample point test, which tests the presence of the sampling point.
4. Check the detector to ensure the following features are operational and programmed in accordance with the Specification:
a. Alarm threshold levels
b. Time delays
c. Sampling tubes in use
d. Detector address
e. Display address
f. Clock time and date
g. Air flow fault thresholds

h. Reset button operable
i. Touch screen operable where installed
j. Units set to U.S./S.I. (for US only) or metric for other regions
k. Check to ensure that all ancillary warning devices operate as specified.

5. Check interconnection with the fire alarm panel to ensure correct operation by executing the Alarm Test, which checks all relay connections to the fire alarm panel.
6. Place the detector in Smoke Test mode and measure the transport times by putting smoke in each sampling hole and by checking the transport times
7. Activate the appropriate Fire Alarm zones and advise all concerned that the system is fully operational.
8. Fill out the Logbook and Commissioning Report accordingly.

3.5 WIRING (ADDITIONAL REQUIREMENTS)

A. General

1. Review the total system point-to-point wiring and cable layout. Provide the correct quantities and types of wires, cables, outlets, and conduits/ raceways to ensure the correct operation of the fire alarm system.
2. Final connections, testing, adjusting, and calibration shall be made under the direct supervision of a Factory-Trained Technician of the System Supplier.
3. All wiring and cables shall be in conduits/raceways. All conduits/race-ways shall be installed and concealed in walls, above ceilings and in floors.
4. All wiring and cables in cabinets shall be neatly formed and laced.
5. Wiring shall be made up onto bolt and nut terminal blocks. Tag all spares. All wire conductors shall terminate on terminal strips with “Spade” “Eyebolt” type lugs, of adequate size for respective incoming and outgoing conductors. The terminal strips shall be labeled as to their use and wiring diagram shall be placed on/inside the equipment showing connections of all related equipment to these strips.
6. Wiring Requirements for shielding certain conductors from other conductors or routing of fire alarm circuits in separate isolated raceways shall be as recommended by the Manufacturer's Documentation and AHJ.
7. The fire alarm circuits, location, quantities of raceways, circuit conductors and devices shown on the Drawings are schematic. Provide all conduit, raceways, wiring, cables, devices and conductors per Manufacturer’s recommendations and as required by AHJ. Include all material and labor costs in the Contract price for compliance with providing a complete and operable fire alarm system.
8. Wire and cable shall be type and size to ensure installed circuit voltage drop and signal loss does not exceed Manufacturer's recommendations, but in no case shall the voltage drop and/or signal loss exceed the values permitted by the AHJ, including allowances for spare capacity/devices.
9. Provide End of the Line (EOL) circuit termination device on each wiring circuit, for the trouble supervisory monitoring of each circuit by the fire alarm system.
10. All fire alarm raceways/conduit shall be installed concealed in public areas. All conductors and cables shall be installed in raceways/conduits.

3.6 SPECIAL INSTALLATION REQUIREMENTS

A. General

1. Whether or not shown on the Fire Alarm Drawings, the following systems shall be provided as part of the Contract. Provide fire alarm devices and connection of the systems to the fire alarm control panel including all material, labor, and cost in the Contract.

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B. Area Protection Automatic Smoke Detectors and Heat Detectors
   1. Area protection smoke detectors and heat detectors shall be ceiling mounted unless noted otherwise on the Drawings. Smoke detectors that are installed before final job site cleanup is complete by all trades shall be cleaned or replaced with new smoke detectors to match original smoke detectors.
   2. Provide detector quantities to ensure a minimum of one automatic detector for each 600 square feet of area, (and fraction thereof) for each building space where smoke detectors are required by the AHJ. In no case shall detector spacing exceed Manufacturer's or AHJ maximum recommendations/limits.
   3. Provide detector quantities to ensure the centerline to centerline spacing of installed detectors does not exceed Manufacturer's and AHJ's Requirements in the protected area.
   4. Locate area protection detectors a minimum of 48 inches horizontal distance from any air transfer grill/vent, air intake grill/vent and air discharge grill/vent.
   5. Provide connection of automatic initiating devices to the fire alarm multiplex control system with 0.75-inch conduit and digital multiplex communications conductors.

3.7 OUTLET BOXES (ADDITIONAL REQUIREMENTS)

A. Device outlet boxes shall be flush mounted unless indicated otherwise on the Drawings. Provide extension rings to finish flush with finish surface. Where the Drawings indicate surface mounted devices, outlet boxes shall be cast metal with threaded hubs. Where the conduit entrances are not exposed for surface mounted devices, provide flush outlet box behind the device box and omit the conduit hubs on the device box.

B. Size device boxes and outlet boxes per Manufacturer recommendation and as required by Building Code for wire fill and construction.

C. Outlet boxes shall be listed and approved for fire alarm system use by AHJ and UL.

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END OF SECTION 28 46 20
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SECTION 31 01 90 - LANDSCAPE AND SITE MAINTENANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Landscape maintenance and related work as shown on the Drawings and specified herein including, but not necessarily limited to, the following:
   1. Tree, shrub, ground cover and turf areas.
   2. Irrigation systems.
   3. General site clean-up.

B. Related Requirements:
   1. Section 32 80 00 - Irrigation
   2. Section 32 90 00 - Planting

1.2 REFERENCES AND REGULATORY REQUIREMENTS

A. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

1.3 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

1.4 ACTION SUBMITTALS

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A. Product Data: Manufacturer's product information on pesticides and herbicides to be used for approval prior to use.

1.5 QUALITY ASSURANCE

A. Control of Work: Comply with Section 5 of the Standard Specifications.

B. Control of Materials: Comply with Section 6 of the Standard Specifications.

C. The Maintenance Contractor shall be experienced in horticulture and landscape maintenance, practices, and techniques, and shall provide sufficient number of workers with adequate equipment to perform the work during the Landscape Maintenance Period.

1.6 LANDSCAPE MAINTENANCE PERIOD

A. Landscape Maintenance Period shall be 90 calendar days.

B. Continuously maintain the entire project area during the progress of the work, during the specified Landscape Maintenance Period or until Final Acceptance of the project by the Owner's Representative.

C. Landscape Maintenance Period shall not start until all elements of construction, planting and irrigation for the entire project are completed in accordance with Contract Documents. A prime requirement is that turf and landscape areas shall be planted and that turf areas shall show an even, healthy stand of "sod-like" turf which shall have been mown twice. If such criteria are met to the satisfaction of the Owner's Representative, a written notification shall be issued to establish the effective beginning date of Landscape Maintenance Period. Additionally, elements included in the Pre-maintenance Punch-list shall have been completed to the satisfaction of the Owner's Representative. The Landscape Maintenance period shall, at the discretion of the Owner's Representative, be allowed to start and finish at different times in different areas as applicable.

D. A day of improper maintenance, as determined by the Owner's Representative, shall not be credited as an acceptable Landscape Maintenance Period day. The Landscape Maintenance Period shall be extended on a day-for-day basis should this occur until proper maintenance, as determined by the Owner's Representative, is being performed.

E. Contractor shall secure the project site against trespass, vandalism, and theft during the Landscape Maintenance Period. Security procedures shall be coordinated with the Owner's Representative.

1.7 GUARANTEE

A. All work executed under this section shall be guaranteed against any and all poor, inadequate or inferior materials and/or workmanship, as determined by the Owner's Representative, for the entire Landscape Maintenance Period and for a period of one year after Final Acceptance of project.

B. The Contractor shall install all replacement material in conformance with the Contract Documents.

1.8 FINAL ACCEPTANCE

A. Upon completion of all project work, including Landscape Maintenance Period, the Owner's Representative will, upon written request from the Contractor (2 working day minimum notice), make an observation to determine conformance with the Contract Documents.

B. If, at the final project observation, work is found at variance with the Contract Documents, or is otherwise unacceptable, the Owner's Representative shall issue a punch-list of items requiring attention to the Contractor. The Contractor shall repair, replace, or otherwise correct all non-compliant work, continue Landscape Maintenance Period, and make another written request to the Owner's Representative to verify punch-list completion. If punch-list is found to be incomplete, or if site is still found to be unacceptable, the Contractor shall be back-charged as necessary for this and all additional observations required to issue Final Acceptance. All replacement materials and installations shall be in accordance with the Contract Documents. Remove rejected work and materials immediately from project. Prior to Final Acceptance, Contractor shall provide the Owner's Representative with all Record Drawings and written Guaranty Statements in accordance with the Contract Documents.

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PART 2 - PRODUCTS

2.1 MATERIALS

A. Materials used shall either conform to Specifications in other Sections or shall otherwise be acceptable to the Owner's Representative. The Owner's Representative shall be given a monthly record of all herbicides, insecticides and disease control chemicals used.

B. Maintenance Fertilizer: "Gro-Power High Nitrogen" as available through Gro-Power, Inc., 800-473-1307, or accepted equal, and shall contain the following chemical analysis:

Percent	Chemical
14%	nitrogen
4%	phosphoric acid
9%	potash

C. Humus: Inactive, decomposed organic material approved by Owner's Representative.

PART 3 - EXECUTION

3.1 MAINTENANCE

A. General: Proper maintenance, including watering, weeding, mowing, edging, fertilization, repairing, and protection is required until Final Acceptance of the entire project but not less than the specified Landscape Maintenance Period.

B. Watering: Water appropriately for each plant type to insure vigorous and healthy growth until work is accepted. Water or irrigate in a manner to prevent runoff or erosion. When hand watering, use a "water wand" to break the water force.

C. Weeding: Entire project site shall be kept free of weeds at all times. Control new weed growth with pre-emergent herbicides. If weeds develop, use legally approved herbicides.

1. No herbicide shall be used without the Owner's Representative prior consent. Use herbicides in accordance with manufacturer's recommendations. If selective herbicides are used, extreme caution shall be observed so as not to damage other plants. Spraying shall only be done under windless conditions.
2. Disease and Pest Control: Disease and insect damage shall be controlled by the use of fungicides and insecticides, subject to the prior consent of the Owner's Representative. Mole and gopher mitigation shall be accomplished using legal means other than poison baits.

D. Staking: Stakes shall remain in place through the maintenance and guaranty periods and shall be periodically inspected and adjusted by the Contractor to prevent rubbing that causes bark wounds, loosen for proper growth or other appropriate reasons.

E. Protection: The Contractor shall maintain protection of planting areas until Final Acceptance. Damaged areas shall be repaired or replaced at the Contractor's expense. Install a temporary maintenance fence using 4-foot blaze orange with steel driven stakes, or acceptable equal, around all turf areas for the entire length of Landscape Maintenance Period.

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F. Trash: Remove trash in all project areas plus adjacent pedestrian walkways and parking areas for the entire length of Landscape Maintenance Period.

G. Replacement: Refer to the Article "Guarantee" in Part 1.

3.2 IRRIGATION SYSTEM

A. System Observation: The Contractor shall visually check all systems for proper operation on a weekly basis and make necessary repairs. Equipment shall be adjusted as necessary for proper coverage and function.

B. Controllers: Program automatic controllers for appropriate seasonal water requirements. Perform a full instruction session in the presence of the Owner's designated maintenance personnel demonstrating programming, system testing, and trouble shooting. Include instructions on how to turn off system in case of emergency.

C. Repairs: Repairs made to the irrigation system shall be at the Contractor's expense. Repairs, when required, shall be made within 24 hours of discovery by either Owner or Contractor.

3.3 FIELD QUALITY CONTROL

A. Final Review:

1. At, or near the end of specified Landscape Maintenance Period, the Contractor shall make a written request for a final review and the work shall be reviewed for conformance with the Construction Documents.
2. If the work is not accepted at time of review, a punch-list of items requiring attention will be prepared by the Owner's Representative and issued to the Contractor for correction.
3. The Landscape Maintenance Period shall be extended at Contractors sole cost, as necessary.

4. Upon completion of the punch-list, the Contractor shall again make written request for review. If, upon re-visiting the site, it is found that the punch-list has not been completed, the review shall end and a subsequent visit shall not be scheduled until the Contractor can assure the Owner the work is complete. The incomplete punch-list review meeting and any further visits and reviews, and re-inspections required due to Contractor not being prepared, or non-conformance with the Construction Documents, shall be back charged to the Contractor.

B. Final Acceptance: When work is found to be in conformance with the Contract Documents, subject to the discretion of the Owner's Representative, a statement of Final Acceptance shall be issued to the Contractor.

END OF SECTION 31 01 90

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SECTION 32 01 90 - EXISTING TREE PROTECTION AND MAINTENANCE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Protection of trees and other plants that are scheduled to remain.
   2. Work necessary to ensure that trees, and landscaping in general, designated on the Drawings to remain receive all due protection, care, and maintenance necessary to ensure their survival.
   3. Irrigation as directed or as required to maintain the health of trees and other plants to remain, where existing irrigation of such plants is shut down for the work of this Contract.

B. Work specifically includes the following:
   1. Erection of barriers and other general protective measures.
   2. Placement of wood shavings.
   3. Care of roots during grading.
   4. Inspection and recommendations.
   5. Repair and/or replacement of trees and other plants damaged during the construction operations.
   6. Repair and/or replacement of any irrigation systems damaged or removed during construction operations.

C. Related Requirements:
   1. Section 02 41 13 - Site Clearing and Demolition
   2. Section 31 01 90 - Landscape and Site Maintenance
   3. Section 32 80 00 - Irrigation
   4. Section 32 90 00 - Planting

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1.2 REFERENCES AND REGULATORY REQUIREMENTS

A. American Joint Committee on Horticultural Nomenclature (AJCHN), Standardized Plant Names.
B. American Association of Nurserymen, Inc. (AAN), American Standard for Nursery Stock.
C. Sunset Western Garden Book, Lane Publishing Company.
D. Agricultural Code of California.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Contractor shall avoid injury or damage resulting from the Contractor's operations, including:
   1. Cutting, breaking, or skinning of roots, trunks, or branches.
   2. Smothering or soil compaction by stockpiled materials, excavated materials, foot or vehicular traffic within the dripline.
   3. Desiccation due to interruption of existing irrigation schedule.

C. Pre-Construction Meetings: The Tree Work Contractor: Prior to commencing installation of Tree Protection Measures (TPM's), or performing any tree work or tree removal work, arrange and have the tree work contractor attend a pre-construction meeting with the Owners Representative to review tree protection requirements, TPM's, tree work and work procedures prior to commencing such on-site work.
   1. Other Contractors: Unless specifically agreed to in advance by the Owners Representative, schedule all other contractors so as to be present on site to attend a single pre-construction meeting with the Owners Representative to review project specific tree protection

requirements and review work procedures prior to commencing on-site activities. Schedule meeting after TPM's have been installed and accepted by the Owners Representative.

1.4 ACTION SUBMITTALS

A. Product Data: Manufacturer's descriptive literature or "cut-sheets" for all products proposed for use.

1.5 EXAMINATION

A. At the outset of construction, the Contractor shall have all trees to remain inspected by a qualified and experienced arborist, and the recommendations of the arborist shall be submitted in writing to the Owner's Representative.

B. The Contractor shall be notified by the Architect of any changes or additions to the procedures herein specified.

1.6 GUARANTEE

A. If a tree to remain is destroyed, or damaged so that in the judgment of the Owner's Representative it should be replaced, it shall be removed at Contractor's expense. Except as provided below, liquidated damages will be assessed at the rate of $350.00 per inch of circumference at 12 inches above grade for trees with a diameter of 8 inches or less and at D.B.H. (Diameter at Breast Height) for diameters greater than 8 inches.

B. If irrigated turf or groundcover to remain is destroyed or damaged so that in the judgment of the Owner's Representative it should be replaced, it shall be removed at the Contractor's expense. Unless shown or specified otherwise, liquidated damages will be assessed at the rate of $15.00 per square foot of turf or groundcover area.

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PART 2 - PRODUCTS

2.1 MATERIALS

A. Protective Fencing: 6 foot high, self-supporting, chain link. Materials and installation shall conform to the requirements of the Chain Link Fence Manufacturers Institute (CLFMI) "Product Manual." Driven support posts are not acceptable.

PART 3 - EXECUTION

3.1 GENERAL

A. Protect, prune, irrigate and maintain all existing trees and other vegetation not designated for removal.

B. At a minimum, protect existing trees and other vegetation not designated for removal from the following:
   1. Breaking, cutting and skinning of branches, bark and roots.
   2. Stockpiling of building materials, soil or trash within dripline.
   3. Vehicular traffic and parking.

C. Trees and other vegetation not designated for removal that become damaged during the life of the project shall be repaired or replaced by the contractor at no cost to the Owner subject to the discretion of the Owner's Representative.

3.2 TREE PROTECTION

A. Tree Protection Zones (TPZ): Unless otherwise expressly permitted by the Owners Representative in writing, establish a 20 foot TPZ as measured horizontally and radially from the edge of the root flare at the ground surface at all trees to be preserved.

B. TPZ Access and Uses:
   1. TPZ's are intended to control access and limit physical damage to canopy and root system, and to prevent harmful changes to growing conditions such as altered drainage, or soil compaction.
   2. No ground disturbing construction such as clearing and grubbing, trenching, grading or excavation, nor other construction activities such as demolition, long or short term debris, spoils, soils and materials stockpiling or storage, washout or dumping of wastes and contaminants, equipment staging, equipment access, or worker access, shall be permitted within TPZ's unless specifically enumerated in the owners Representative accepted tree protection documents, or as may be otherwise specifically established by written agreement between the owners Representative.

C. Ground Disturbance Controls:
   1. Relocate from and/or limit ground disturbing activities within TPZ's.
   2. Obtain Owners Representative acceptance of all ground disturbing work and contractor means and methods proposed within the TPZ's prior to commencing such work.
   3. Perform all such Owners Representative accepted ground disturbing work in a manner that minimizes root disturbance and soil compaction.
   4. As may be requested by the Owners Representative, employ alternative means and methods including but not limited to clearing and grubbing by hand tools and/or hand operated equipment, demolition using a "lifting" technique, and excavation and trenching by hand digging, soil vacuuming, air spading or hydraulic jetting, or by boring in lieu of trenching, employing cellular confinement backfilled with class ii permeable material in lieu of subgrade excavation, scarification and/or compaction.
   5. Reflect Owners Representative accepted ground disturbance control measures in tree protection documents and/or Construction Plan as appropriate.

D. Equipment Access Controls:
   1. Where mechanized equipment access within TPZ's is accepted by the Owners Representative, but prior to accessing equipment, protect tree trunks and limbs to a minimum height of 8 feet above the soil line.
   2. Wrap the tree trunk and/or limbs with burlap wrap fiber rolls, place vertical 2 x 4 wood slats set 8 inches on center over the netting and secure with orange safety fencing and nylon or metal banding, or continuously spiral wrap trunk and limbs with burlap covered rice straw wattles.
   3. Do not attach fasteners into the tree.
   4. Prior to accessing equipment within TPZ's, protect soil from compaction by placing and then maintaining wood chips to a depth of 6 inches in all areas of the TPZ subject to equipment traffic.
   5. Based upon equipment to be used and access frequencies planned, provide additional protection measures such as steel plating or cellular confinement filled with class ii permeable material as may be directed by the Owners Representative.
   6. Throughout the project duration, the Owners Representative reserves the right to require the Contractor to reposition equipment or utilize alternative construction methods to avoid damage to trees to be preserved.
   7. Reflect Owners Representative accepted equipment access control measures in tree protection documents and/or Construction Plan as appropriate.

E. Aerial Equipment Controls:

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1. When Construction Plan utilizes aerial equipment such as cranes or boom trucks, such equipment staging and maneuvering shall be subject to Owners Representative acceptance.
2. Aerial movements of boom or suspended loads shall avoid passing over or in close proximity to canopies of trees to be preserved.
3. The Owners Representative reserves the right to require spotters and/or to require the repositioning of equipment or utilization of alternative equipment to avoid movements in close proximity to canopies of trees to be preserved.
4. Reflect Owners Representative accepted aerial equipment control measures in tree protection documents and/or Construction Plan as appropriate.

F. Tree Protection Fencing (TPF) :
1. Install a 6 foot tall self-supporting chain link type TPF at perimeter of TPZ of all trees to be preserved.
2. Where site constraints and safety considerations prevent placement of the TPF at the limits of the TPZ, obtain direction from the owners representative and locate fence as directed.
3. Caution: Owners Representative accepted adjustments in TPF locations do not alter the extents of the actual TPZ's or the requirements related thereto.
4. Mount Owner-furnished tree protection signs on TPF in a manner and in locations as may be directed by the Owners Representative.
5. Where Owners Representative accepted work within TPZ's requires temporary relocation of TPF, obtain Owners Representative acceptance for proposed fence relocation prior to relocation.
6. Promptly relocate TPF to the original alignment whenever not actively engaged in working within a specific TPZ.

G. Work Monitoring:
1. When required by the Owners Representative, all work performed within TPZ's shall be continuously monitored by the Owners Representative and/or Project Arborist, if retained.
2. Coordinate scheduling of work with availability of the designated monito.

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H. Tree Roots:
1. Severing roots greater than 1 inch in diameter within the TPZ requires prior written authorization by the Owners Representative.
2. Where roots in excess of 1 inch in diameter are encountered within the TPZ, avoid damaging the roots as set forth above in ground disturbance controls.
3. If damage is unavoidable, suspend work prior to damaging the roots, protect exposed roots, and request a change assessment as set forth above in assessments. Do not resume work or damage roots until Owners Representative has provided written instructions.
4. Roots damaged during construction shall be exposed to sound tissue and cut cleanly.
   a. Sever roots cleanly by cutting with a sharp hand saw.
   b. Severed roots greater than 1 inch in diameter are subject to field review by the Owners Representative prior to backfilling.

I. Canopy Pruning:
1. Pruning of tree canopies for clearance during construction shall be allowed only with prior acceptance by the Owners Representative. Notify the Owners Representative of proposed canopy pruning and request a change assessment as set forth above in assessments.
2. Where practical, the Owners Representative may require that tree limbs be temporarily tied back in lieu of pruning.
3. When pruning is not permitted, perform work by alternate means that does not require pruning of canopies.
4. Tying and pruning work shall be performed under the supervision of the Owners Representative.

3.3 PROTECTIVE FENCING

A. Prior to site clearing, demolition or grading, install acceptable protective fencing around all existing trees and other vegetation not designated for removal 1 foot beyond dripline or as directed by Owner's Representative.
B. Locate structural roots by hand probing and set posts with care to preclude root damage.
C. Space protective fencing posts at 6'-0" centers maximum and securely attach fabric.
D. Maintain protection until Final Acceptance of project.
E. Install signage indicating that the protective fencing and area within shall not be disturbed.
F. When work is required within the fenced protection area, submit a written request to the Owner's Representative stating work to be performed and approximate time of completion. No work shall be allowed within the protected fenced area without the prior acceptance by the Owner's Representative. Fencing shall be replaced promptly following completion of work within fenced areas.

3.4 GRADING AND TRENCHING

A. The earth surface within protective fencing shall not be altered except as acceptable to the Owner's Representative. Grading and trenching necessary within the dripline shall be done by hand at the discretion of the Owner's Representative.

3.5 IRRIGATION

A. Provide and maintain irrigation for existing trees and other vegetation not designated for removal as necessary to promote healthy, vigorous growth. Weekly watering shall occur with a 20 minute soak equivalent to 100 gallons per tree.

3.6 ROOT PRUNING

A. Root pruning shall consist of a smooth, final cut and shall be performed wherever a root 2 inches or more in diameter has been broken or severed.

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3.7 CANOPY PRUNING

A. Pruning shall be completed by a tree care contractor or under supervision of a licensed arborist.
B. Prune existing trees to remain in accordance with the following guidelines:
    1. Proper removal of dead branches and live "stubs" 3 inches and over in diameter.
    2. Removal of broken or loose branches and other debris lodged in trees and shrubs.
    3. Removal of live branches which interfere with tree structural strength and healthful development. These include:
        a. Limbs which rub and abrade a more "important" or dominant branch, and as directed by the Owner's Representative.
        b. Limbs of weak structure.
        c. Limbs with twigs and foliage obstructing the development of more "important" branches, as directed by the Owner's Representative.
        d. Branches near the end of a limb which may produce more weight than the limb is likely to support.
        e. Branches conflicting with building or vehicular roadways.
    4. Removal of branches located between grade level and 10 feet above grade over pedestrian walkways.
C. Selectively prune branches as deemed necessary by the Owner's Representative.

3.8 PRUNING REPAIRS

A. Prune and treat damaged area as directed by the Owner's Representative.

3.9 CLEAN-UP

A. Branches, trimmings and debris remaining upon completion of each operation shall become property of the Contractor and shall be promptly removed from the site.

END OF SECTION 32 01 90

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SECTION 31 11 00 - CLEARING, GRUBBING, AND STRIPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Clearing vegetation, debris, trash and other materials within limits indicated.

B. Grubbing of vegetation within limits indicated.

C. Stripping of topsoil within limits indicated.

D. Dust alleviation and control.

E. The work shall include the provision of all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

1.2 RELATED SECTIONS

A. Section 02 4000 – Demolition

1.3 SUBMITTALS

A. Caltrans Standard Specifications.
   1. Section 16: Clearing and Grubbing

B. California Building Code: Chapter 33 – Site Work, Demolition, and Construction.

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C. Construction Management Plan prepared by _____

1.4 ACTION SUBMITTALS

A. Follow submittal procedure outline in the Division 1 specifications.

1.5 PROJECT CONDITIONS

A. The contractor shall be familiar with the existing conditions and responsible for the removal of all rubbish, debris, and other unsuitable materials on the surface of the site.

B. The contractor shall provide adequate dust alleviation and control measures at all times during the course of work.

C. Unidentified Materials
   1. If unidentified materials are discovered, including hazardous materials that will require additional removal other than is required by the Contract Documents, immediately report the discovery to the Owner's Representative.
   2. If necessary, the Owner's Representative will arrange for any testing or analysis of the discovered materials and will provide instructions regarding the removal and disposal of the unidentified materials.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 PREPARATION

A. Locate and clearly flag vegetation to remain or be relocated.

B. Protect existing site improvements to remain during construction.

3.2 RESTORATION

A. Repair or replace vegetation or trees indicated to remain that is damaged by construction operations, as directed by the Owner.

B. Employ a qualified arborist, licensed in jurisdiction where the Project is located, to submit details of proposed repairs and to repair damage to shrubs or trees.

3.3 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.

B. Trees and shrubs designated for removal should have the rootballs and any roots greater than ½-inch diameter removed completely. Grade depressions resulting from rootball removal should be cleaned of loose material and backfilled in accordance with the Geotechnical Report.

C. Remove trash, debris, logs, concrete, masonry, and other waste materials.

D. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.

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E. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18-inches below subgrade.

F. Use only hand methods for grubbing within drip line of remaining trees.

3.4 SITE STRIPPING

A. Remove trash, debris, weeds, roots, and other waste materials.

B. Do not stockpile within drip line of remaining trees.

C. The site should be stripped of all surface vegetation, and surface and subsurface improvements within the proposed development area. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Surficial stripping should extend about 2 to 6 inches below existing grade in vegetated areas.

3.5 DUST ALLEVIATION AND CONTROL

A. Contractor shall be responsible for providing pollution and dust abatement and control measures continuously during the course of the work.

B. Water used should be the minimum necessary for dust control. Contractor is responsible for supplying all water for construction and dust control.

3.6 DISPOSAL AND CLEANUP

A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris shall become the property of the Contractor unless otherwise specified herein or noted on the plans, and shall be removed from the work site by the Contractor and disposed of off-site in a lawful manner.

END OF SECTION 31 11 00

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SECTION 31 23 00 - EXCAVATION AND FILL

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.

B. Excavation and/or embankment from existing ground to subgrade, including soil sterilant, for roadways, driveways, parking areas, walks, paths, or trails and any other site improvements called for on the Plans.

C. Dust Alleviation and Control.

D. Supplying all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

1.2 SECTION EXCLUDES

A. Earthwork related to underground utility installation, see Section 31 2333 – Trenching and Backfilling.

1.3 RELATED SECTIONS

A. Section 31 1100 – Clearing, Grubbing, and Stripping

B. Section 31 2333 – Trenching and Backfilling.

1.4 RELATED DOCUMENTS

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A. Geotechnical Investigation Report titled "Geotechnical and Foundation Investigation", dated June 16, 2021, prepared by Geocon Consultants.

B. Construction Management Plan prepared by_____.

C. American Society for Testing and Materials (ASTM) Standards

1. D 424, Test Method for Plastic Limit and Plasticity Index of Soils.
2. D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
3. D 1586, Method for Penetration Tests and Split-Barrel Sampling of Soils.
4. D 2419, Sand Equivalent Value of Soils and Fine Aggregate.
5. D 2487, Classification of Soils for Engineering Purposes.
6. D 3740, Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
7. D 4318, Test Method for Liquid Limit, Plastic Limit and Plasticity Index of Soils.
8. E 329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.
9. E 548, Guide for General Criteria Used for Evaluating Laboratory Competence.

D. California Code of Regulation Title 24, Part 2, California Building Code:

10. Chapter 11B – Accessibility to Public Buildings.
11. Chapter 33 – Site Work, Demolition and Construction.

E. Caltrans Standard Specifications:

12. Section 17, Watering.
13. Section 19, Earthwork.

F. California Occupational Safety and Health Administration (CAL/OSHA), Title 8.

G. California Building Code.

H. California Plumbing Code.

1.5 DEFINITIONS

A. Borrow: Approved soil material imported from off-site for use as Structural Fill or Backfill.

B. Excavation: Removal of material encountered above subgrade elevations.

1. Authorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions as shown on plans or authorized by the Geotechnical Consultant.
2. Unauthorized Over-Excavation: Excavation below subgrade elevations or beyond indicated horizontal dimensions without authorization by the Geotechnical Consultant. Unauthorized excavation shall be without additional compensation.

C. Geotechnical Testing Agency: An independent testing agency qualified according to ASTM E 329 to conduct soil materials and rock definition testing, as documented according to ASTM D 3740 and ASTM E 548.

D. Structural Fill: Soil materials approved by the Geotechnical Consultant and used to raise existing grades.

E. Rock: Rock material in beds, ledges, unstratified masses, and conglomerate deposits and boulders of rock material ¾-cubic yards or more in volume that, according to ASTM D 1586, exceeds a standard penetration resistance of 100 blows/2-inches.

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F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man made stationary features constructed above or below grade.

G. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, base or topsoil materials.

H. Unsuitable Material: Any soil material that is not suitable for a specific use on the Project.

I. Utilities: onsite underground pipes, conduits, ducts and cables.

1.6 ACTION SUBMITTALS

A. Follow submittal procedures outlined in the Division 1 Specifications.

B. Submit material certificates signed by the material producer and the Contractor, certifying that that each material item complies with, or exceeds the specified requirements.

1.7 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Consultant.

B. Conform all work to the appropriate portion(s) of the California Code of Regulations, Title 24 and Caltrans Standard Specifications, Sections 17 and 19.

C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.

D. Perform excavation, filling, compaction and related earthwork under the observation of the Geotechnical Consultant. Materials placed without approval of the Geotechnical Consultant will be presumed to be defective and, at the discretion of the Geotechnical Consultant, shall be removed and replaced at no cost to the Owner. Notify the Geotechnical Consultant at least 24-hours prior to commencement of earthwork and at least 48 hours prior to testing.

E. Geotechnical Consultant will perform observations and tests required to enable him to form an opinion of the acceptability of the Project earthwork. Correct earthwork that, in the opinion of the Geotechnical Consultant, does not meet the requirements of these Technical Specifications and the Geotechnical Report.

F. Upon completion of the construction work, certify that all compacted fills and foundations are in place at the correct locations, and have been constructed in accordance with sound construction practice. In addition, certify that the materials used are of the types, quality and quantity required by these Technical Specifications. The Contractor shall be responsible for the stability of all fills and backfills constructed by his forces.

1.8 PROJECT CONDITIONS

A. Promptly notify the Owner of surface or subsurface conditions differing from those disclosed in the Geotechnical Report (if applicable). First notify the Owner verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and disclosed in the Geotechnical Report will be allowed unless the Contractor has notified the Owner in writing of differing conditions prior to the Contractor starting work on affected items.

B. Protect open excavations, trenches, and the like with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.

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C. Prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

D. Temporarily stockpile fill material in an orderly and safe manner and in a location approved by the Owner and if required, the City of Dublin.

E. Provide dust and noise control in conformance with Division 1 General Requirements continuously throughout the course of work.

F. Environmental Requirements: When unfavorable weather conditions necessitate interrupting earthwork operation, areas shall be prepared by compaction of surface and grading to avoid collection of water. Provide adequate temporary drainage to prevent erosion. After interruption, compaction specified in last layer shall be re-established before resuming work.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from on-site excavations.

B. Obtain approval of on-site soil materials and borrow materials to be used for structural fill or structural backfill from the Geotechnical Consultant.

C. On-Site Fill – Excavated Bay Mud should not be used as engineered fill. Bay Mud also may not be suitable for use as landscape soil due to its marine origin and generally high sulfate content. Bay Mud encountered during excavating or grading should be segregated from the fill such that the drier fill

material is not mixed with wet Bay Mud. In addition, the soft alluvial clays that underly the site would also likely be wet, soft, and likely unusable during grading without substantial drying and mixing.

On-site soils with an organic content less than 3 percent by weight may be reused as general fill. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2-1/2 inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

D. Imported Fill – Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also no be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

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2.2 SOIL STERILANT

A. Commercial chemical for weed control, registered by EPA. Provide granular, liquid or wet-able powder form.

PART 3 - EXECUTION

3.1 GENERAL

A. Conform to Section 19, Earthwork, Caltrans Standard Specifications as modified by the Contract Documents.

B. Placement and compaction of material by flooding, ponding, or jetting will not be permitted.

C. The use of explosives will not be permitted.

3.2 CONTROL OF WATERING AND DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding the site and surrounding area. Provide dewatering equipment necessary to drain and keep excavations and site free from water.

B. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.

C. Obtain the Geotechnical Consultant's approval for proposed control of water and dewatering methods.

D. Protect subgrades from softening, undermining, washout and damage by rain or water accumulation.

E. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations.

F. Maintain dewatering system in place until dewatering is no longer required.

3.3 WET WEATHER CONDITIONS

A. Do not prepare subgrade, place or compact soil materials if above optimum moisture content.

B. If the Geotechnical Consultant allows work to continue during wet weather conditions, conform to supplemental recommendations provided by the Geotechnical Consultant.

3.4 BRACING AND SHORING

A. Conform to California and Federal OSHA requirements.

B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the facility being

constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

C. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Geotechnical Consultant, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations related to the proposed facility shall precede a response to the submittal by the Owner.

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D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the position or operation of the facility being constructed or adjacent utilities and facilities.

3.5 EXCAVATION

A. Excavate earth and rock to lines and grades shown on drawings and to the neat dimensions indicated on the Plans, required herein or as required to satisfactorily compact backfill.

B. Remove and dispose of large rocks, pieces of concrete and other obstructions encountered during excavation.

C. Where forming is required, excavate only as much material as necessary to permit placing and removing forms.

D. Provide supports, shoring and sheet piles required to support the sides of excavations or for protection of adjacent existing improvements.

3.6 REMOVAL OF EXISTING FILLS AND UNSUITABLE MATERIAL

A. Over-excavate areas of existing fills and other unsuitable material encountered during mass grading as directed by the Geotechnical Consultant.

B. Compensation for increased removal widths and depths that are not required by the Geotechnical Consultant will not be considered, except when such increase is necessary for protection of life and property as determined by and approved by the Owner.

C. The Geotechnical Consultant will provide written approval for each excavation prior to placement of fill. Allow adequate time after excavation and before filling for the Geotechnical Consultant's review and written approval and, if necessary, time for the Owner to conduct as built survey prior to placing fill. Basis for calculating the quantity of material excavated or placed may be the difference between the grading shown on the Plan and an as built survey of the grading.

3.7 GRADING

A. Uniformly grade the Project to the elevations shown on plans.

B. Finish ditches, gutters and swales to the sections, lines and grades indicated and to permit proper surface drainage.

C. Round tops and bottoms of slopes as indicated or to blend with existing contours.

3.8 SUBGRADE PREPARATION

A. Install underground utilities and service connections prior to final preparation of subgrade and placement of base materials for final surface facilities. Extend services so that final surface facilities are not disturbed when service connections are made.

B. Prepare subgrades under paved areas, curbs, gutters, walks, structures, other surface facilities and areas to receive structural fill.

C. Prepare subgrades for paved areas, curbs and gutters by plowing or scarifying surface at least 6 inches below final subgrade elevations and 5-feet beyond edge of pavement unless specified otherwise by the Geotechnical Consultant. Uniformly moisture condition to obtain optimum moisture contents. Break clods and condition surface by harrowing or dry rolling. Remove boulders, hard ribs and solid rock. Prepare earth uniform for full depth and width of subgrade.

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D. Protect utilities from damage during compaction of subgrades and until placement of final pavements or other surface facilities.

E. Obtain the Geotechnical Consultant's approval of subgrades prior to placing pavement and other improvements thereon.

F. The Contractor shall at all times maintain the subgrade surface in such condition as to readily drain effectively. Vehicular and equipment traffic shall be distributed across the prepared surface in such a manner as to prevent continual operation in one path. The Contractor shall repair any damage to the prepared subgrade.

G. Storage or stockpiling of heavy loads on the roadway subgrade will not be permitted. Use only approved storage areas.

H. The Contractor shall be responsible for any failure of the underlying soils during the course of the work and shall repair any damage.

3.9 PLACEMENT OF STRUCTURAL FILL

A. Obtain the Geotechnical Consultant's approval of surface to receive structural fill prior to placement of structural fill material.

B. Place structural fill on prepared subgrade.

C. Spread structural fill material in uniform lifts not more than 8-inches in un-compacted thickness and compact.

D. Place structural fill material to suitable elevations above grade to provide for anticipated settlement and shrinkage.

E. Overbuild fill slopes, as required by the Geotechnical Consultant, to obtain required compaction. Remove excess material to lines and grades indicated.

F. Do not drop fill on structures. Do not backfill around, against or upon concrete or masonry structures until structure has attained sufficient strength to withstand loads imposed and the horizontal structural system had been installed.

3.10 BUILDING PAD FINISHED GRADING

A. Blade finish lots to lines and grades indicated.

B. Protect the building pas during wet-weather, earthwork, and construction operations in accordance with the Geotechnical Report and Geotechnical Engineer's field recommendations.

3.11 COMPACTION AND TESTING

A. Do not compact by ponding, flooding or jetting.

B. Compact native soils and structural fill at 1% above optimum water content. Aerate material if it is too wet. Add water to material if it is too dry. Thoroughly mix lifts before compaction to ensure uniform moisture distribution.

C. Compact native expansive clays at 3% percent above the optimum water content

D. Perform compaction using rollers, pneumatic or vibratory compactors or other equipment and mechanical methods approved by the Geotechnical Consultant.

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E. Compaction requirements: All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be places in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from the geotechnical representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report. Where the soils are 20 or greater, the expansive soil criteria should be used.

3.12 FIELD QUALITY CONTROL

A. The Engineer will inspect, test and approve subgrades and fill layers before further construction is permitted thereon; and will conduct a sufficient number of tests chosen at Engineer's discretion to enable said Engineer to approve fill as it is placed. Areas to receive structural fills and all structural excavations shall be approved before covering or filling.

B. If in the Engineer's opinion, based on the results of testing for subgrade or fills which have been placed and compacted below the specified density, the Contractor shall provide additional compaction, with subsequent retesting by the owner until the affected subgrade or fill is approved.

C. Finish soil grade tolerance at completion of grading:

1. Building and paved areas: +0.05

2. Other areas: □□□0.10 feet.

3.13 DUST ALLEVIATION AND CONTROL

A. Contractor shall be responsible for and shall provide pollution and dust abatement and control measures satisfactorily during the course of the work.

B. The Contractor shall utilize reclaimed water, or dust palliatives, if necessary for compliance with the City's Water Conservation Ordinance.

3.14 FINISH OPERATIONS AND CLEANUP

A. Satisfactorily restore any existing improvements, paving, landscaping, and other utilities disturbed during the course of constructing the improvements.

B. Surplus materials and construction debris remaining upon completion of the work shall become the property of the Contractor unless otherwise specified herein or noted on the plans and shall be removed from the work site by the Contractor and disposed of off-site in a lawful manner.

END OF SECTION 31 23 00

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SECTION 31 23 33 - TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.

B. Excavation, bedding, and backfill for underground piping systems specified in Storm Drainage Utilities - Section 33 4000, Sanitary Sewerage Utilities – Section 33 3000, Water Utilities – Section 33 1000.

C. Dust Alleviation and Control.

1.2 SECTION EXCLUDES

A. Work within the City's right-of-way. All work within the City's right-of-way shall conform to the requirements of the City Encroachment Permit issued for this project and shall be in accordance with the City of Dublin.

1.3 RELATED SECTIONS

A. Section 31 2300 – Excavation and Fill.

B. Section 33 1000 – Water Utilities.

C. Section 33 3000 – Sanitary Sewerage Utilities

D. Section 33 4000 – Storm Drainage Utilities.

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1.4 RELATED DOCUMENTS

A. California Building Code: Chapter 33 – Site Work, Demolition and Construction.

B. Construction Management Plan prepared by _____.

C. American Society for Testing and Materials (ASTM) Standards

1. C 33, Specification for Concrete Aggregates.
2. C 136, Sieve Analysis of Fine and Coarse Aggregates
3. C 150, Specification for Portland Cement.
4. C 260, Specification for Air-Entraining Admixtures for Concrete.
5. C 618, Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Portland Cement Concrete.
6. D 424, Plastic Limit and Plasticity Index of Soils
7. D 1557, Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort.
8. D 2321, Practice for Underground Installation of Flexible Thermoplastic Sewer Pipe.
9. D 2419, Sand equivalent Value of Soils and Fine Aggregate.
10. D 2487, Classification of Soils for Engineering Purposes.
11. D 3740, Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.
12. E 329, Specification for Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction.

13. E 548, Guide for General Criteria Used for Evaluating Laboratory Competence.

D. California Code of Regulation Title 24, Part 2, California Building Code:

14. Chapter 11B – Accessibility to Public Buildings.
15. Chapter 33 – Site Work, Demolition and Construction.

E. Caltrans Standard Specifications:

16. Section 19, Earthwork.
17. Section 26, Aggregate Bases.
18. Section 68, Subsurface Drains.
19. Section 88, Engineering Fabrics.

1.5 DEFINITIONS

A. AC: Asphalt Concrete.

B. Bedding: Material from bottom of trench to bottom of pipe.

C. PCC: Portland Cement Concrete.

D. Trench Excavation: Removal of material encountered above subgrade elevations and within horizontal trench dimensions.

1. Authorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions as shown on plans or authorized by the Geotechnical Consultant.
2. Unauthorized Trench Over-Excavation: Excavation below trench subgrade elevations or beyond indicated horizontal trench dimensions without authorization by the Geotechnical Consultant. Unauthorized excavation shall be without additional compensation.

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E. Utility Structures:

1. Storm drainage manholes, catch basins, drop inlets, curb inlets, vaults, etc.
2. Sanitary sewer manholes, vaults, etc.
3. Water vaults, etc.

1.6 ACTION SUBMITTALS

A. Follow submittal procedures outlined in the Division 1 Specifications.

B. Product Data:

1. Grading and quality characteristics showing compliance with requirements for the Work.
2. Certify that material meets requirements of the Project.

C. Samples:

1. If required by the Geotechnical Consultant, provide 40-pound samples of all imported trench bedding and backfill material sealed in airtight containers, tagged with source locations and suppliers of each proposed material. Do not import materials to Project without written approval of the Geotechnical Consultant.
2. Provide materials from same source throughout work. Change of source requires approval of the Geotechnical Consultant and the Owner.

D. Material Test Reports: Provide, from a qualified testing agency, the following test results showing compliance with the project requirements:

1. Classification according to ASTM D 2487 of each imported trench bedding and backfill material.
2. Laboratory compaction curve in conformance with ASTM D 1557 for each imported trench bedding and backfill material.

E. Shoring and Sheeting Plan: Before starting work submit a CAL-OSHA permit for the shoring and sheeting plan when trench excavation is five feet deep or more.

F. Dewatering Plan: If required in the Special Conditions, before starting work submit a dewatering plan describing the basic components of the dewatering including silt control, etc.

G. Traffic Plan: Where lane closures are anticipated, submit a Traffic Control Plan per City of Dublin requirements in advance for approval prior to starting work.

1.7 QUALITY ASSURANCE

A. Conform all work and materials to the recommendations or requirements of the Geotechnical Report and meet the approval of the Geotechnical Consultant.

B. Conform all work to the appropriate portion(s) of the Caltrans Standard Specifications, Section 19.

C. Percentage of compaction specified shall be the minimum acceptable. The percentage represents the ratio of the dry density of the compacted material to the maximum dry density of the material as determined by the procedure set forth in ASTM D 1557.

D. The Geotechnical Consultant will perform observations and tests required to enable him to form an opinion of the acceptability of the trench backfill. Correct the trench backfill that, in the opinion of the Geotechnical Consultant, does not meet the requirements of these Technical Specifications and the Geotechnical Report.

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E. Conform work to the requirements of the California Building Code.

1. Section 1806A.11 – Pipe and Trenches.

1.8 PROJECT CONDITIONS

A. Existing Utilities:

1. Unless shown to be removed, protect active utility lines shown on the Plans or otherwise made known to the Contractor prior to excavating. If damaged, repair or replace at the Contractor's expense. Pothole as required to verify utility location.
2. If active utility lines are encountered and are not shown on the Plans or otherwise made known to the Contractor, promptly take necessary steps to assure that service is not interrupted.
3. If a known service is interrupted as a result of work under this section, immediately restore service by repairing the damaged utility at Contractor's expense.
4. If foreseen or unforeseen existing utilities are newly found to interfere with the permanent facilities being constructed under this Contract, immediately notify the Engineer and secure his instructions.
5. Do not proceed with permanent repair or relocation of utilities until written instructions are received from the Engineer.

B. Promptly notify the Owner of surface or subsurface conditions differing from those disclosed in the Geotechnical Report. First notify the Owner verbally to permit verification and extent of condition and then in writing. No claim for conditions differing from those anticipated in the Contract Documents and

disclosed in the Geotechnical Report will be allowed unless Contractor has notified the Owner in writing of differing conditions prior to contractor starting work on affected items.

C. Protection of Persons and Property:

1. Protect open, trenches, and utility structure excavations with fences, covers and railings to maintain safe pedestrian and vehicular traffic passage.
2. Install all necessary underpinning, shoring, lagging, cribbing, and bracing of ample strength to support adjoining soils, paving and structures. All such items shall be so constructed that they will not interfere with the building of any structural elements, and shall be removed upon completion of the shoring operation.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by operations of Contractor.
4. All open trenches shall be protected during non-working hours.

D. Shoring

1. The Contractor is solely responsible for all bracing and shoring. The Contractor shall forward their application for shoring to the California Division of Industrial Safety for their review. Contractor's application shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a Civil Engineer registered in California.
2. If an application for a shoring permit is required, no excavation in trench section or around structures shall proceed until the approved shoring plan has been received by the Engineer.

E. Dewatering

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1. Remove all water, including rain water, encountered during trench and sub-structure work to an approved location by pumps, drains, and other approved methods.
2. Keep excavations and site construction area free from water.

F. Stockpile on-site and imported backfill material temporarily in an orderly and safe manner.

G. Provide dust and noise control in conformance with local requirements and project storm water pollution prevention plan.

H. Maintain and/or replace all bench marks, monuments, construction stakes, and other reference points needed to complete the work described in this section at the contractor or owner’s expense.

I. Repair or restore damage to any portion of the work resulting from movement of the sides or bottom of trenches or other excavation which is attributable to the Contractor's acts or omissions, whether sides are braced or not.

PART 2 - PRODUCTS

2.1 GENERAL SOIL MATERIALS

A. In general, soils used for backfill shall be select material free of debris, roots, wood, scrap material, vegetation, refuse, soft unsound particles, frozen, deleterious, or objectionable materials, satisfactory to the Geotechnical Consultant, free of stones or lumps exceeding 3 inches in greatest dimension.

B. Beddings and pipe embedment materials to be used around underground utility pipes should be well graded-sand or gravel in accordance with the project Geotechnical Report and the manufacturer’s

recommendations.

2.2 PIPE BEDDING AND INITIAL BACKFILL

A. ASTM D 2321, Class IA, IB or II.

1. Clean and free of clay, silt or organic matter.

B. Permeable Material: Conform to Section 68-1.025 of Caltrans Standard Specifications, Class 1, Type A or Class 2.

C. Class 2 Aggregate Base: Conform to Section 26 of Caltrans Standard Specifications, ¾-inch maximum.

D. Sand: Conform to Section 19-3.025B of Caltrans Standard Specifications.

E. Bedding and backfill material shall be subject to the approval of the Geotechnical Consultant, or designated Inspection/Testing Firm.

2.3 CONCRETE STRUCTURE BEDDING AND BACKFILL

A. Precast Structures: Same materials to the same heights as specified for pipe bedding and backfill, or other material approved by the Geotechnical Consultant.

B. Poured-in-Place Structures:

1. Bedding: Bedding shall meet the approval of the Geotechnical Consultant. In general, bedding is not required, pour bases against undisturbed native earth in cut areas and against engineered fill compacted to 90% relative compaction in embankment areas.

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PART 3 - EXECUTION

3.1 TRENCHING AND EXCAVATION

A. Existing PCC or AC Areas: Cut PCC or AC to full depth at a minimum distance of 6-inches beyond the edge of the trench.

B. Over-Excavations: Backfill trenches that have been excavated below bedding design subgrade, with approved bedding material.

C. Comply with the Owner's and the City of Dublin's limitations on the amount of trench that is opened or partially opened at any one time. Do not leave trenches open overnight without the approval of the Owner or the City of Dublin.

D. Where forming is required, excavate only as much material as necessary to permit placing and removal of forms.

E. Excavation for thrust blocks shall be neat to the line and dimensions shown or called for on the plans.

F. Bottoms of trenches will be subject to testing by Geotechnical Consultant. Correct deficiencies as directed by the Geotechnical Consultant.

G. Grade bottom of trench to provide uniform thickness of bedding material and to provide uniform bearing and support for pipe along entire length. Remove stones to avoid point bearing.

3.2 CONTROL OF WATER AND DEWATERING

A. Be solely responsible for dewatering trenches and excavations and subsequent control of ground and surface water. Provide and maintain such pumps or other equipment as may be necessary to control ground water and seepage to the satisfaction of the Geotechnical Consultant and the Owner until backfilling is completed.

B. Dewater during backfilling operation so that groundwater is maintained a least one foot below level of compaction effort.

C. Obtain the Geotechnical Consultant's approval for proposed control of water and dewatering methods.

D. Reroute surface water runoff away from open trenches and excavations. Do not allow water to accumulate in trenches and excavations.

E. Maintain dewatering system in place until dewatering is no longer required.

3.3 BRACING AND SHORING

A. Conform to California and Federal OSHA requirements.

B. Place and maintain such bracing and shoring as may be required to support the sides of the excavations for the proper protection of workmen; to facilitate the work; to prevent damage to the pipes and appurtenances being constructed; and to prevent damage to adjacent structures or facilities. Remove all bracing and shoring upon completion of the work.

C. Be solely responsible for all bracing and shoring and, if requested by the Owner, submit details and calculations to the Owner. The Owner may forward the submittal to the Geotechnical Consultant, the Consulting Engineer and/or the California Division of Industrial Safety for their review. The Contractor's submittal shall include the basic design, assumed soils conditions and estimation of forces to be resisted, together with plans and specifications of the materials and methods to be used, and shall be prepared by a civil engineer or structural engineer registered in California. No excavations in trench section or around structures shall precede a response to the submittal by the Owner.

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D. Be solely responsible for installing and extracting the sheathing in a manner which will not disturb the line, grade, or backfill compaction or operation of the utility being installed or adjacent utilities and facilities.

3.4 TRENCH PLUGS

A. Where utility trenches extend to an approximate depth of 10 feet or more (the top typical seasonal ground water), trench "plugs", consisting of a neat cement slurry, will be placed at approximate 100 feet intervals on-Site and at all locations where the utility trenches (10 feet or greater in depth) extend off-Site. The "plugs" will extend approximately 1 foot in length.

B. Utility Bedding

Bedding and pipe zone backfill typically extends from the bottom of the trench excavations to a minimum of 6 inches above the crown of the pipe. Pipe bedding material should consist of crushed aggregate, clean sand or similar open-graded material. Proposed bedding and pipe zone materials should be reviewed by Geocon prior to construction; open-graded materials such as ¾ inch drain rock may require wrapping with filter fabric to mitigate the potential for piping. Pipe bedding and backfill should also conform to the requirements of the governing utility agency.

C. Utility Trench Backfilling

Underground utility trenches should be backfilled with properly compacted material. The material excavated from the trenches should be adequate for use as backfill provided it does not contain

deleterious matter, vegetation or rock larger than six inches in maximum dimension. Trench backfill should be placed in loose lifts not exceeding eight inches and should be compacted to at least 90% relative compaction at least 2% above optimum moisture content.

D. Native material approved by the District Engineer can be used up to a minimum of 36 inches below asphalt pavement grade. A minimum of 36 inches of structural backfill is required by the District within the upper 36 inches of trench backfill.

E. All trench backfill is to be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils will be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from the geotechnical representative) will evaluation the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. Where the soils plasticity index (P1) is 20 or greater, the expansive soil criteria should be used.

3.5 PIPE BEDDING

A. Obtain approval of bedding material from the Geotechnical Consultant.

B. Accurately shape bedding material to the line and grade called for on the Plans. Carefully place and compact bedding material to the elevation of the bottom of the pipe in layers not exceeding 8-inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Consultant. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Consultant. Jetting or ponding of bedding material will not be permitted.

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C. Upon completion of bedding operations, and prior to the installation of pipe, notify the Geotechnical Consultant, who will inspect the bedding layer. Do not commence pipe laying until the Geotechnical Consultant has approved the bedding.

3.6 BACKFILLING

A. Obtain approval of backfill material from Geotechnical Consultant.

B. Bring initial backfill up simultaneously on both sides of the pipe, so as to prevent any displacement of the pipe from its true alignment. Carefully place and compact initial backfill material to an elevation of 12-inches above the top of the pipe in layers not exceeding 8-inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction unless specified otherwise on the Plans or by the Geotechnical Consultant. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Consultant. Jetting or ponding of initial backfill material will not be permitted.

C. Bring subsequent backfill to subgrade or finish grade as indicated. Carefully place and compact subsequent backfill material to the proper elevation in layers not exceeding 8-inches in loose thickness. Compact bedding material at optimum water content to 90% relative compaction, except that the upper 36-inches in areas subject to vehicular traffic shall be compacted to at least 95% relative compaction, unless specified otherwise on the Plans or by the Geotechnical Consultant. Compact by pneumatic tampers or other mechanical means approved by the Geotechnical Consultant. Jetting or ponding of subsequent backfill material will not be permitted.

D. Do not use compaction equipment or methods that produce horizontal or vertical earth pressures that may cause excessive pipe displacement or damage the pipe.

E. Utility backfill shall be inspected and tested by the Geotechnical Consultant during placement. Cooperate with the Geotechnical Consultant and provide working space for such tests in operations. Backfill not compacted in accordance with these specifications shall be re-compacted or removed as necessary and replaced to meet the specified requirements, to the satisfaction of the Geotechnical Consultant and the Owner prior to proceeding with the Project.

3.7 FIELD QUALITY CONTROL

A. The Geotechnical Consultant, or designated Inspection/Testing Firm, will inspect, test and approve trench backfill layers before further construction is permitted thereon. Number of tests required will be determined by the Geotechnical Consultant, or designated Inspection/Testing Firm.

B. If backfill has been placed, that is below the specified density, provide additional compaction with subsequent retesting until successful compaction is achieved and approval is received from the Geotechnical Consultant.

3.8 DUST ALLEVIATION AND CONTROL

A. Contractor shall be responsible for and shall provide pollution and dust abatement and control measures satisfactorily during the course of the work.

B. The Contractor shall utilize reclaimed water, or dust palliatives, if necessary for compliance with the City's Water Conservation Ordinance.

3.9 FINISH OPERATIONS AND CLEANUP

A. Pipes shall be laid to finished grades indicated on the plans.

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B. Satisfactorily restore any existing improvements, paving, landscaping, and other utilities disturbed during the course of constructing the improvements.

C. Surplus materials and construction debris remaining upon completion of the work shall become the property of the Contractor unless otherwise specified herein or noted on the plans, and shall be removed from the work site by the Contractor and disposed of off-site in a lawful manner.

D. Upon completion of utility earthwork all lines, manholes catch basins, inlets, water meter boxes and other structures shall be thoroughly cleaned of dirt, rubbish, debris and obstructions of any kind to the satisfaction of the Owner.

END OF SECTION 31 23 33

SECTION 32 13 00 - CEMENT CONCRETE PAVEMENT - SITE

PART 1 GENERAL

1.1 SUMMARY

A. This Section specifies cast-in place site concrete paving, formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes and joint sealants, for the following:

1. Pedestrian Concrete paving at Site Level outside building
2. Concrete Stairs – Site Level outside building

1.2 REFERENCES

A. Standard Specifications - Standard Specifications of the State of California, Business and Transportation Agency, Department of Transportation, (CDT).

B. ASTM - American Society for Testing and Materials

1. ASTM C309 - Liquid Membrane-Forming Compounds for Curing Concrete.
2. ASTM C979 - Pigments for Integrally Colored Concrete.
3. ASTM D-1557-Compaction

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C. ACI - American Concrete Institute, Manual of Concrete Practice.

D. California Building Code (2007) Paving Slip Resistance of Exposed Exterior Surfaces: Section 1133B.7.1.

1.3 DEFINITIONS

A. Percent Compaction: ASTM D1557, percentage of the maximum in-place dry density of the same material as determined by Soils Engineer.

1.4 SUBMITTALS

A. Product Data: Manufacturers' current printed specifications and catalogue cuts of the following:
1. Expansion joint filler, backer rod and bond breaker and/or zip strip.
2. Integral color Admixture
3. Joint Sealant
4. Material Certificates:
a. Sub-base material
b. Cementious materials and aggregates.
c. Steel reinforcement and reinforcement accessories.
d. Admixtures.

B. Paving Concrete Mix Design:

C. Samples:
1. Joint Sealant Samples

D. LEED Requirements:
   1. LEED credit MR2.2 Environmentally Preferable Products: provide documentation demonstrating the recycled content percentages for the concrete. The target is 30% flyash or slag. This information should be tracked by the contractor.
   2. LEED credit MR2.2 Environmentally Preferable Products: provide documentation demonstrating the regional material percentages for the product. This information should be tracked by the contractor.
   3. LEED credit 3.1 Reduce Site Heat Island Effects: install light-colored, high albedo materials for 50% of the sidewalks, patios, and driveways

1.5 QUALITY ASSURANCE

A. Mix Standards: Conform to the ACI Manual and the Portland Cement Association's "Design and Control of Concrete Mixes". Perform work in accordance with ACI 301, Section 6 - Architectural Concrete.

B. All reinforcing steel shall be accompanied by producer's certificates of mill analysis in accordance with CBC 1929A.2.

C. Aggregate tests per CBC 1903A.3.

D. Owner's Testing Agency will perform concrete compression tests and other quality control testing and inspection as indicated.

E. Lines and Levels: To be established by a licensed Surveyor or registered Civil Engineer.

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F. Slip Resistance: All paving surfaces shall be slip resistant consistent with CBC Title 24 requirements.

1.6 MOCK-UPS

A. 6 Weeks prior to construction of concrete pavement (to allow for 28 days of curing), Cast mockups of full-size sections of concrete pavement to demonstrate typical joints, surface finish, texture, color, exposed aggregate/pebble, and standard of workmanship. Provide (1) 6-foot x 6-foot sample of each concrete Paving Type. Construct all mock-ups adjacent to each other, so they all can be reviewed at the same time.

B. Each mock-up is to contain all joint types specified on project, including construction, contraction, and expansion and finishes as indicated.

C. Approved mock-ups will not remain as part of completed work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Cement Products:
   1. Mixed On Site: Protect all packaged materials from dampness. Segregate all stockpiled accessories to prevent contamination or accidental mixing.
   2. Delivered Mixes: Coordinate delivery so that mixes may be immediately poured upon arrival at site.

B. Components and Accessories:

1. Fittings and Reinforcements: Protect from rust, soil and oil contamination at all times. Store on pallets above ground.

1.8 SEQUENCING AND SCHEDULING

A. Coordination: Coordinate all items of other trades to be furnished and set in place. Coordinate proper installation of all accessories embedded in the concrete and for the provision of holes, and openings necessary to the execution of the work of the trades.

B. Attachments: Insure that such portions of their work which are all or in part embedded, built-in, attached to, supported by or covered over by the concrete work are executed by them in ample time that progress of the work is not delayed.

C. Cutting or Patching: Perform as necessary to comply with above injunction.

D. Reinforcing Steel: Install progressively with work of other trades. Coordinate each other's schedules so as to avoid disturbing or moving work already installed by one trade to admit the work of another. Each trade shall be entirely responsible for proper installation and securing of their accessories and components during placing of concrete.

PART 2 – PRODUCTS

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2.1 AGGREGATE BASE

A. Aggregate Base meeting requirements for Caltrans Class 2 Aggregate Base in conformance with Standard Specification 26-1.02B.

2.2 FORMS

A. Form Materials: Wood or metal materials to provide full-depth, continuous, straight, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet (30.5 m) or less.

2.3 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets. 6 X 6 – W2.9 X W2.9

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.

C. Plain Steel Wire: ASTM A 82

D. Deformed-Steel Wire: ASTM A 496.

E. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60 (Grade 420), deformed bars; assembled with clips.

F. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60 (Grade 420). Cut bars true to length with ends square and free of burrs.

G. Hook Bolts: ASTM A 307, Grade A internally and externally threaded. Design hook-bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.

H. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice."

2.4 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:

1. Portland Cement: ASTM C 150, Type II
2. Fly Ash: Pozzitive Glass Pozzolan (Sioneer) ASTM C618.

B. Normal-Weight Aggregates: ASTM C 33, Class 4M or 1N coarse aggregate, uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.

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B. Water: ASTM C 94/C 94M.

C. Air-Entraining Admixture: ASTM C 260.

D. Chemical Admixtures: ASTM C 494/C 494M, of type suitable for application, certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.

2.5 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth.

A. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

B. Water: ASTM C 94/C 94M.

C. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

D. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

E. White Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 2, Class B.

F. Chemical Surface Retarder: Water-soluble, liquid-set retarder with color dye, for horizontal concrete surface application, capable of temporarily delaying final hardening of concrete to a depth of 1/8 to 1/4 inch (3 to 6 mm).
   1. Products:
      a. Grace – Topcast –No. 15

2.6 CONCRETE MIXTURE

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

   1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

   1. Pedestrian pavements:
      a. Compressive Strength (28 days): 3,000 psi.
      b. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45
      c. Slump Limit: 4 inches (100 mm, plus or minus 1 inch (25 mm).
   2. Vehicular pavements:
      a. Compressive Strength (28 days): 3,500 psi.

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C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content as follows:

   1. Air Content: 4-percent plus or minus 1.5 percent for 3/4-inch (38-mm) nominal maximum aggregate size.

D. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.

E. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

   1. Use water-reducing admixture, water-reducing and retarding admixture in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

F. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.7 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.

1. When air temperature is between 85 deg F (30 deg C) and 90 deg F (32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

2.8 EXPANSION JOINT MATERIALS

A. Pre-molded Joint Filler: ASTM D1751, non-extruding and bituminous type resilient filler, compatible with sealant and backer rod.

B. Sealant Backer Rod:
1. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.
2. Backer Strips for Cold- and Hot-Applied Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.
3. Round Backer Rods for Cold-Applied Sealants: ASTM D 5249, Type 3, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

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C. Snap Cap: Seal tight Snap Cap by W.R. Meadows or similar.

D. Joint Sealer
1. Type: Multi-component polyurethane sealant, FS TT-S-00227, Class A, type as recommended by manufacturer for exterior locations subject to foot traffic.
2. Product: ASTM C290, non-snag sealant "Dynatred" by Pecora Corporation, (214) 278-8158, or "Sonolastic Sealant Two-Part" by Sonneborn, (612) 835-3434. Or approved equivalent.
3. Color: Submit Samples

E. Bond Breaker: Polyethene tape as recommended by joint sealant manufacturer where bond to joint filler must be avoided for proper performance of joint sealer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Verify that subgrade has been rough graded for concrete paving and accepted under another Section prior to commencement of work.

B. Surface Drainage:
1. Report in writing conflicts discovered on the site or prior work done by others, which would prevent drainage.

2. No "birdbaths" or other surface irregularities will be permitted. Properly correct irregularities.

3.2 PREPARATION

A. Subgrade Preparation: Prepare and Compact sub grade as required by Section 310000 “Earthwork”.

B. Aggregate Base Course: Install and Compact Aggregate Base as required by Standard Specifications for Class 2 Aggregate Base.

C. Templates: Use templates for all anchor plates, bolts, inserts and other items embedded in concrete. Accurately secure so that they will not be displaced during placing of concrete.

3.3 INSTALLATION

A. Formwork:
1. Construct forms accurately to dimensions, plumb and true to line and grade. Use forms that are substantial, mortar tight and braced so as to maintain position and shape during placing of reinforcing and concrete. Concrete work showing wavy slab surfaces will be rejected.
2. Carefully verify and check all forms for alignment and level as the work proceeds. Promptly make all needed adjustments or additional bracing.
3. Extend wood forms for all exposed concrete at least 6 in. below finish grade.
4. Construct forms and assemble them in such a manner that joints occur at accepted locations. Install metal key joints at locations indicated on submittal drawings.
5. Coat form surfaces in contact with concrete with form release agent. Clean forms after each use and coat with form release agent as necessary to assure separation from concrete without damage.

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B. Edges: Except where tooled corners are indicated, provide all exposed concrete finish work with smooth, even surfaces of dense concrete with clean sharp rises and outside corners. Provide 24-gauge splice plates at butt joints.

C. Sleeves, Recesses and Openings: As shown on the Drawings or as directed at the site. Install pipe sleeves for irrigation system under walks and driveways. One per each walk or driveway, and pin for future identification.

D. Reinforcements:
1. Supports: Hang footing bars from forms. Support with suitable metal cradles.
2. Placement: Clean, bend and place reinforcements per ACI Manual of Concrete Practice. Accurately and securely fasten to prevent displacement before or during pouring.
3. Reinforcement Splices: 24 bar diameters minimum, except as otherwise noted.

3.4 CONCRETE PLACEMENT

A. Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", and as specified.

B. Protect concrete from physical damage or reduced strength due to weather extremes during mixing, placing, and curing. In cold weather comply with ACI 306, "Recommended Practice for

Cold Weather Concreting". In hot weather comply with ACI 305, "Recommended Practice for Hot Weather Concreting".

C. Moisten base to provide a uniform dampened condition at the time concrete is placed.

D. Construction tolerances do not permit the violation of dimensions or grades and slopes and their relationships required by code. Adjust work as required to comply with such requirements.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a [1/4-inch (6-mm)] radius. Eliminate tool marks on concrete surfaces and finishes.

3.5 JOINTS

A. General: Construct control, expansion, and construction joints properly aligned with face perpendicular to concrete surface, except as indicated otherwise.

B. Expansion Joints and Isolation Joints at Walls
1. Locations: Provide joints at locations and intervals shown on the Drawings, and where concrete work abutting curbs, walls, structures, walks, and other fixed objects.
2. Locate expansion joints as indicated. When not indicated, provide joints at maximum 20'-0" on center for curbs and walks. Align expansion joints in abutting curbs and walks.
3. Install joint fillers full-width and depth of joint. Recess top edge below finished surface to depth indicated on Drawings.
4. Provide joint fillers in single lengths for the full slab width, whenever possible. Fasten joint filler sections together when multiple lengths are required.
5. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.
6. Forming: Form joints and other edges in the fresh concrete using an edging tool to provide a smooth uniform impression.
7. Sealing: After the curing period, carefully clean expansion joints and fill with joint compound to 1/4 in. below adjacent paved surface. Do not permit spillage on paved surfaces or overflow from joint.

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C. Saw Cut Control Joints: Paving Types P1-01a and P1-01b
1. Locate Joints as indicated.
2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3-mm-) wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness.
3. Saw cutting for Control joints should be performed
a. Before concrete starts to cool.
b. As soon as the concrete surface is firm enough not to be torn or damaged by the blade, and
c. Before random drying-shrinkage cracks can form in the concrete slab.
d. Cutting should be undertaken sequentially to reduce the longest length of the slab, avoiding the creation of long, thin panels. Then cutting across the width of the slab/panel from the middle of one long side to the middle of the opposite long side.

E. Tooled Control Joints: Paving Type P1-B

1. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness.

2. Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 1/4-inch (6-mm) radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.

3.6 FINISHES

A. Slip Resistance Requirements: All exposed exterior paving finishes shall meet the requirements of California Building Code (2007) Section 1133B.7.1.

B. Finish Schedule as shown in the Drawings.

C. Medium Broom Finish

1. Obtain even finish by drawing a stiff bristled broom across a floated finish.
2. Broom Finish shall be as approved in the mockup.
3. Direction of brooming to be perpendicular to direction of work or as shown on Drawings.

D. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

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3.7 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

B. Comply with ACI 306.1 for cold-weather protection.

C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.

E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
1. Moist Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus 3/8 inch, minus 1/4 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.
4. Lateral Alignment and Spacing of Tie Bars and Dowels: 1 inch.
5. Vertical Alignment of Tie Bars and Dowels: 1/4 inch.
6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: 1/2 inch.
7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Pavement Edge: Length of dowel 1/4 inch per 12 inches.
8. Joint Spacing: 3 inches.
9. Contraction Joint Depth: Plus 1/4 inch), no minus.
10. Joint Width: Plus 1/8 inch, no minus.

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3.9 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

C. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

D. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

E. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
1. Do not leave gaps between ends of backer materials.
2. Do not stretch, twist, puncture, or tear backer materials.
3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

F. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses provided for each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

G. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
   1. Remove excess sealants from surfaces adjacent to joint.
   2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.

H. Provide recessed joint configuration for silicone sealants of recess depth and at locations indicated.

3.10 FIELD QUALITY CONTROL

A. Testing: Owner will select a qualified testing agency to take samples for testing during the course of the work as considered necessary.

B. Cost of Testing: Paid for by Owner.

C. Notification: Notify the testing agency in sufficient time to allow taking of samples at time of pour.

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D. Rejected Materials: Remove off the site all concrete below specified strength.

F. Cost of Removal and Retesting: Pay for all costs of removal of rejected concrete, and its replacement with concrete of specified strength and retesting.

3.11 CLEANING AND PATCHING

A. Cleaning:
   1. Removal: Remove all projecting fins, bolts, wire, nails, etc., not necessary for the work, or cut them back 1 in. from the surface and patch in an inconspicuous manner.
   2. Voids: Fill holes with a 1:3 cement and sand mortar with the same color as the adjoining concrete. Mix and place the mortar as dry as possible and finish flush with the adjacent surface.

B. Patching:
   1. Corrective Patching: Correct all defects in concrete work. Chip all voids to a depth of at least 1 in. with the edges perpendicular to the surface and parallel to form markings. Fill all voids, surface irregularities, or honeycombing by patching or rubbing. Insure that all concrete surfaces so repaired duplicate the appearance of the unpatched work.
   2. Defective Work: Remove in its entirety and replace all defective concrete work, which after corrective patching, rubbing, etc., fails to duplicate the appearance of unpatched work and/or conform to the standards set forth in these Specifications.

END OF SECTION 32 13 00

SECTION 32 80 00 - IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Landscape irrigation system work is shown on the Drawings including, but not necessarily limited to, the following:
   1. Water supply to irrigation system.
   2. Low voltage control wiring from controllers to remote control valves.

B. Work Included Under Other Sections:
   1. Irrigation water stub-out.
   2. Irrigation sleeves.

C. Related Requirements:
   1. Section 31 01 90 - Landscape and Site Maintenance
   2. Section 32 90 00 - Planting

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. D1785 - Standard Specifications for (PVC) Plastic Pipe, Schedules 40 and 80.
   2. D2241 - Standard Specifications for PVC Pressure-Rated Pipe (SDR Series).
   3. D2564 - Standard Specifications for Solvent Cements for (PVC) Plastic Pipe and Fittings.
   4. F2768 - Standard Specification for Modified Stub ACME Thread Joint with Elastomeric Seal in Plastic Piping Components.
   5. D2855 - Standard Practice for the Two-Step (Primer and Solvent Cement) Method of Joining Poly (Vinyl Chloride) (PVC) or Chlorinated Poly (Vinyl Chloride) (CPVC) Pipe and Piping Components with Tapered Sockets.
   6. F512 - Standard Specification for Smooth-Wall Poly (Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.
   7. D2672 - Standard Specification for Joints for IPS PVC Pipe Using Solvent Cement.

B. National Sanitation Foundation (NSF), requirements for Seal of Approval.

C. Plastics Pipe Institute (PPI), recommendations for hydrostatic design stresses for PVC pipe.

D. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

E. Permits and Fees: Contractor is responsible to obtain all required permits and pay all associated fees unless otherwise noted.

F. Irrigation Association/American Society of Irrigation Consultants, Landscape Irrigation Best Management Practices, 2014 edition.

1.3 ADMINISTRATIVE REQUIREMENTS

A. Substitutions for specified products shall be submitted for approval in accordance with Section 01 25 00 – Substitution Procedures.

B. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

C. Coordination, Sequencing, and Scheduling:
   1. Contractor shall be solely responsible for coordinating, sequencing and scheduling work with applicable trades and subcontractors so as to ensure proper and timely installation of the irrigation system.
   2. The entire irrigation system shall be under full automatic operations for a period of two days prior to beginning of planting. Coordinate with Section 32 90 00 – Planting.

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D. Permits and Fees: Contractor is responsible to obtain all required permits and pay all associated fees unless otherwise noted.

1.4 ACTION SUBMITTALS

A. Shop Drawings: A diagrammatic drawing of proposed mainline route and equipment locations for approval by the Owner's Representative. The Drawings may be marked and used for marking layout and equipment locations.

B. Product Data: Manufacturer's literature or cut sheets of products specified and to be incorporated into the irrigation system. Specific products being submitted shall be highlighted or shown on boxes on cut sheets to designate which items are being submitted. Submittals not marked appropriately will be rejected.

C. Materials List: Prior to installation, submit a materials list. Include manufacturer, model number, and description of all materials and equipment. List shall also include sealants, cements, lubricants and other proprietary items.

1.5 CLOSEOUT SUBMITTALS

A. Record Drawings as specified.

B. Maintenance equipment as specified.

C. Warranties and Guarantees

1.6 RECORD DOCUMENTS

A. Comply with Section 01 78 39 – Project Record Documents.

B. Accurately record locations of all piping and equipment that varies from what is shown on the Drawings. Locations are to be clearly dimensioned horizontally to within 1 foot and vertically to within 0.5 feet from a hardscape edge or permanent site feature.

1. The valve size, station number and gallons per minute shall be legible at each valve and shall match how the controller is wired.
2. Additionally, each valve shall be annotated to describe which type of irrigation it is; rotor, rotator, spray, bubbler, drip tubing or other.
3. Symbols for valves shall be annotated as: meter (M), backflow preventer device (BFP), master valve (MV), flow sensor (FS), hydrometer (H), quick coupler valve (QCV).

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C. Contractor shall record and scan and submit PDF files of full size plan set of Record Drawings (As-builts Drawings) to the Owner's representative, and two sets of color coded plans shall be produced, one for placement at or within the irrigation controller cabinet reduced to 11" x 17", and one full size set for submittal to the Owner or stored at another location selected by the Owner's Representative.

1. Both sets shall have all the irrigation valve zone lateral lines color-coded so as to readily distinguish between adjacent zones.
2. The color-coded copies shall then be professionally laminated in minimum 5 mil clear plastic.

1.7 QUALITY ASSURANCE

A. Unless otherwise specified, install all materials in accordance with manufacturer's details, specifications and recommendations.

B. The Contractor shall be responsible to assure the irrigation installer personally or through an authorized and competent representative, supervises the work and retains the same supervisor on the job from commencement to completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store PVC pipe in a neat and orderly manner fully supported and protected from sunlight.

B. Equipment and materials shall be delivered, unloaded, and handled so as to protect from damage at all times.

1.9 FIELD CONDITIONS

A. PVC shall not be cemented during wet conditions at the discretion of the Owner's Representative.
B. Trench excavation and backfilling shall not be performed during excessively wet conditions at the discretion of the Owner's Representative.
C. Water Supply: Connections to, or the installation of, the water supply shall be at the locations shown on the Drawings. Minor changes caused by actual site conditions shall be made at no additional expense to Owner.
D. Discrepancies: In the event of discrepancy, immediately notify the Owner's Representative. Do not proceed with installation or irrigation components or system in areas of discrepancy until discrepancies have been resolved.

1.10 MAINTENANCE EQUIPMENT

A. Turn-over Materials: Provide 1 each of the following to the Owner's Representative:
   1. One quick coupler attachment key equipped with standard thread hose bib for each 5 quick couplers installed on the project.
   2. One key for locking quick coupler covers for each 5 quick coupler valves installed on the project.
   3. One key for hose bib operation for each 5 hose bibs installed on the project.
   4. One set of keys to irrigation controller and other installed locking cabinets or pedestals.

1.11 GUARANTY

A. Contractor: Provide Owner with a separate written guaranty for the entire irrigation system against defects in installation, workmanship and equipment, for a period of 1 year from the date of Final Acceptance.
B. Contractor shall make necessary repairs to the system as well as to other work affected by defects in the system during guaranty period. Repairs shall be made at the Contractor's sole expense.

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PART 2 - PRODUCTS

2.1 GENERAL

A. Use only new materials of brands shown on Drawings, specified herein or as acceptable to the Owner's Representative.

2.2 PIPE

A. General:
   1. Plastic pipe shall be extruded of an improved PVC virgin pipe compound in accordance with ASTM D2672, ASTM D2241 or ASTM D1785.
   2. Pipe shall be marked continuously with manufacturer's name, nominal pipe size, schedule or class, PVC type and grade, National Sanitation Foundation approval, Commercial Standards designation, and date of extrusion.
B. Plastic Pipe: Polyvinyl chloride PVC (Type I) 1120.
   1. Intermittent-Pressure Lateral Piping: 1120-Schedule 40 PVC plastic pipe with Schedule 40, Type 1, Grade 1, PVC solvent weld fittings.
   2. Constant-Pressure Mainline Piping 2 inches and Smaller: Schedule 40 with solvent weld fittings.
   3. If the system is operated with recycled water, PVC pipe shall be "Purple Pipe."

C. Recycled water piping, other than PVC piping with solvent welded joints, shall be protected against movement with thrust blocks or mechanical restraints.

2.3 FITTINGS

A. PVC Fittings: Polyvinyl chloride (Type I) plastic 1120, Schedule 40 or Schedule 80 where noted on the Drawings.
B. PVC Nipples: Polyvinyl chloride (Type I) plastic 1120, Schedule 80.

2.4 SWING JOINTS

A. Swing joints for Rotator and pop-up heads shall be as detailed on the Drawings.
B. Swing Joints for rotors shall be by LASCO Fittings, Inc. with ASTM F2768 Standard for Swing Joint ACME Threads, or equal.

2.5 VALVES AND SENSORS

A. General:
   1. Each valve shall be installed with unions before and after the valve.
   2. Control Valves shall be labeled with tags denoting the associated controllers and station numbers.
   3. Gate Valves and Ball Valves:
      a. Valves shall have a minimum working pressure of not less than 150 psi and shall conform to AWWA standards.
      b. Provide purple tags on all valves if system is designed for recycled water.
B. Gate Valves: As specified on Drawings.
C. Remote Control Valves: As specified on Drawings.
D. Quick Coupling Valves: As specified on Drawings. Provide purple lid if system is designed for recycled water.

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2.6 PLASTIC VALVE BOXES

A. General:
   1. Color of plastic boxes shall be purple.
   2. If black or green valve boxes are required by the Owner for use on recycled water systems, the lids shall be purple or shall have a warning label or nameplate permanently molded into or attached onto the lid with rivets, screws, or bolts.
   3. Warning labels shall be as specified on Drawings.
   4. Valve boxes shall have locking or bolt down type lids.
   5. Markings on valve box covers shall be "heat branded" onto the cover in 1-inch high letters.
   6. Manufacturer: Carson Industries as specified and the basis of design, Applied Engineering Inc., NDS, Christy, or equal.
B. Gate Valves, Round:
   1. Model equivalent to Carson 910-10 with 910-T locking lid.
   2. Boxes shall be labeled as “Irrigation – GV” on lid.
C. Remote Control Valves, Rectangular:
   1. Valves 1 inch and 1-1/2 inches: Model equivalent to Carson 1419-12 with 1419-T locking lid.
   2. Valves 2 inches and larger: Model equivalent to Carson 1730-12 with 1730-T locking lid.
   3. Boxes shall be labeled as “Irrigation – RCV” on lid.
D. Quick Coupling Valves, Round:
   1. Model equivalent to Carson 910-10 with 910-T locking lid.
   2. Boxes shall be labeled as “Irrigation – QC” on lid.
E. Valve Boxes shall have locking or bolt down type lids. Approved box manufactures as equals: Applied Engineering Inc., NDS, Christy, Carson Industries, or equal.

2.7 ELECTRICAL

A. General:
   1. Electrical equipment shall be NEMA Type 3, waterproofed for exterior installations.
   2. Electrical work shall conform to local codes and ordinances.
   3. Remote control wire shall be UL rated for direct burial.
   4. Where two or more controllers are used, the control wires shall be a different color for each controller. These colors shall be noted on the "Record Drawings" placed in the controller cabinet.

B. Low Voltage Control Valve Wiring:
   1. Conductors:
      a. Control Wires: Type UF, 14-gauge wire. Insulating jacket color shall be red.
      b. Common Wires: Type UF, 12-gauge wire. Insulating jacket color shall be white.
      c. Spare Control Wires: Type UF, 14-gauge wire, insulating jacket color shall be blue.
      d. Spare Common Wire: Type UF, 12-gauge wire. Insulating jacket color shall be green.
   2. Splice connectors: 3M DBR-Y6 splice connectors, 3M Scotchcast #3570G-N Connector seal packs, or Spears DS-100 connectors with DS-300 sealant.

2.8 CONNECTING COMPOUNDS

A. Primer: I Weld-On “P-70” Primer by IPS Corporation.
B. Cement: Solvent cementing shall be in conformance with ASTM D2564 and ASTM D2855.
   1. Pipe Diameter up to 6 Inches: Weld-On #705 by IPS Corporation, Low VOC PVC solvent cement for Class 200 PVC or schedule 40 PVC.
   2. Pipe Diameter Larger than 6 Inches and Schedule 80 PVC: Weld-On #711 by IPS Corporation, Low VOC PVC solvent cement.
   3. Flexible PVC to Rigid PVC Connections: Weld-On #795 by IPS Corporation, Low VOC PVC solvent cement.

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2.9 SPRINKLER HEADS

A. Rotors, Rotators and Spray Heads: To match existing.
B. Install with purple rotor covers or head caps.

2.10 Tree and Shrub Bubblers

A. Bubbler Nozzle Assemblies: As specified on the Drawings.
B. Install bubblers with purple caps if system is designed for recycled water.

2.11 ADDITIONAL MATERIALS

A. Tape:
   1. General:
      a. On-site buried recycled water piping shall be identified by warning tape with a minimum width of 3 inches reading “caution – recycled water” (in black or white lettering on purple background). Tape shall run continuously on top of main line piping and shall be attached to piping with plastic tape banded around the warning tape and the pipe every 5 feet on center.
   2. Pipe Detection Tape: 3-inch-wide, detectable type; “Terra Tape” "Sentry Line Detectable” from Reef Industries, Inc., 713.507.4251; or equal.
      a. Text: "Caution Water Line Buried Below."

B. Tracer Wire: Polyethylene insulated, copperclad steel; “SoloShot XTreme Tracer Wire” by Copperhead Industries, LLC. 877-726-5644, or equal.

C. Sleeves: Class 200 PVC. Install sleeves in locations and at the depths shown on the Drawings. Sleeves shall extend a minimum of 6 inches past the edge of the above hard surface for ease of location.
D. Teflon Tape: Variety commonly used for wrapping threaded connections.
E. Valve Tags: Plastic pre-labeled station tags.
F. Recycled Valve Tags: Plastic pre-labeled Purple warning tags.
G. Drain Rock: 3/4-inch wash drain rock.
H. Recycled water valves including isolation valves, irrigation remote control valves, and quick coupling valves shall be tagged using plastic pre-labeled Purple warning tags.
I. Recycled water advisory signs shall be in accordance with Owner's standard details and shall be posted at locations shown on the approved irrigation drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Prior to starting work, test and verify that water pressure levels meet the requirements specified on the Drawings. Notify the Owner's Representative immediately of any discrepancies.
B. Irrigation Drawings are diagrammatic. Main lines and lateral lines shown parallel in the Drawings may be placed in a common trench, provided that a minimum horizontal distance of 3 inches is maintained between buried lines, as per Drawings.
C. Sprinkler heads are shown schematically. Suspected discrepancies in coverage or sizes of areas to be irrigated shall be brought to the attention of the Owner's Representative prior to installation. Contractor shall re-direct work to avoid delay while awaiting resolution.

3.2 PREPARATION

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A. Contractor shall make provisions and take necessary precautions to protect existing and completed work or features.
B. Layout:
   1. Prior to installation, the Contractor shall stake out all pressure supply lines, routing and location of backflow preventer, all valves, sprinkler heads, bubblers, drip tubing, and automatic controller for review by the Owner's Representative.
   2. Layout irrigation system and make minor adjustments required due to differences between site and Drawings. Where piping is shown on Drawings under paved areas, but running parallel and adjacent to planted areas, install the piping in the planted areas.

3.3 TRENCHING

A. Excavate trenches with vertical walls, uniform bottom, free of deleterious materials, and wide enough for pipes to lay side by side, fully supported on trench bedding. There shall be a minimum 3-inch clearance between all pipes.
   1. No lines shall be installed parallel to and directly over another line.
   2. When lines must cross, the angle shall be forty-five to ninety degrees, and a minimum of three inch (3") vertical clearance shall be maintained.
B. Provide minimum coverage depths as follows:
   1. Mainline: 24 inches in landscape areas, 30 inches in sleeves under paving.
   2. Lateral Lines: 18 inches in landscape areas, 30 inches in sleeves under paving.
C. Hydraulic driving methods shall not be used under paved surfaces.

3.4 PIPE INSTALLATION

A. Comply with manufacturer's instructions as applicable.
B. Rubber Ring Seal Joint:

1. Use factory-made male end or prepare field-cut male end to exact specifications of factory-made end.
2. Carefully clean bell or coupling and insert rubber ring without lubricant. Position ring carefully according to manufacturer's specifications.
3. Lubricate male end according to manufacturer's instructions and insert male end to specified depth. Use hands only when inserting PVC pipe.

C. Thrust Blocks:
1. Thrust blocks shall be provided on 3 inch and 4-inch main lines where specified and as necessary to resist system pressure on, and pipe movement of, pressurized lines and fittings. Thrust blocks shall be concrete and the size shall be based on an average soil safe bearing load of 3,000 pounds per square foot.
2. Form thrust blocks in such a manner such that concrete comes in contact only with the fittings, not over the fitting joint. Thrust blocks shall be between solid soil undisturbed and the fitting.
3. Install thrust blocks as shown in Drawings and as described above.
4. Main lines of 3 inches and 4 inches with operating pressures of 85 psi or more, and systems with a booster pump, shall have mechanical restraints at all fittings and changes of flow direction.

D. Solvent Welded Joints:
1. Assemble above ground where possible.
2. Cut square, ream, and thoroughly clean shavings and burs from pipe ends.
3. Make joint using specified primer and cement, continuously wiping off excess.
4. Allow 60 minutes of set-up time before handling and 24 hours curing before applying water pressure.

E. Threaded Joints:
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1. Use Teflon tape on all pressurized, threaded plastic to plastic and plastic to metal joints.
2. Hand tighten and use only light strap-type friction wrench pressure to complete.

F. Snake pipe to provide a minimum of 1 additional foot for each 100 feet of pipe to allow for expansion and contraction.

G. Pipe shall be installed as specified and generally as shown in Drawings.

H. On-site buried recycled water piping shall be identified by using purple-colored PVC pipe with continuous wording: "caution – recycled water" printed on opposite sides of the pipe; pipe shall be laid with wording facing upwards.

I. Maintain a 10-foot horizontal separation between buried pressurized recycled water irrigation piping and buried potable water piping unless otherwise noted. At pipe crossings, buried pressurized recycled water irrigation piping must be 12 inches below potable water lines. Pressurized recycled water pipelines are allowed over potable water pipelines with a minimum of 12 inches vertical separation if a full standard pipe length is centered over the crossing, or the recycled water pipeline is installed in a pipe sleeve which extends a minimum of 10 feet on either side of the potable water piping. Intermittently pressurized irrigation laterals may be located a minimum of 12 inches above potable water pipelines without sleeving.

J. Cap or plug pipe openings as soon as pipes have been installed to prevent intrusions of debris.

K. Sleeves:
1. Install pipe sleeves where necessary, where shown and at all points where pipes pass through concrete or masonry. In footings, install sleeving that allows 1-inch minimum clearance around pipes.
2. Each end of sleeve shall extend a minimum of 6 inches beyond edge of paving or structure above. Provide removable non-decaying plug or cap at each end of sleeve, to prevent earth from entering pipe.

L. Thoroughly flush system prior to installing valves, screens and nozzles.

M. Install pipe detection tape and tracer wire above mainline.

3.5 EQUIPMENT AND INSTALLATION

A. Gate Valves:
1. Install as shown on the Drawings.
2. Valves shall be installed in valve boxes to provide a minimum of 2-inch clearance between the highest point of the valve and the bottom of the valve box lid.
3. Valves shall not be installed in any area that is within the athletic field of play. All valves shall be located within valve boxes set 12 inches from fencing or edge bands as shown.
4. Locate all boxes a minimum of 10 feet from striping of any field of play.

B. Remote Control Valves:
1. Install as shown in Drawings.
2. Valve boxes shall be set plumb, flush, and square with adjacent structures.
3. Valves shall be installed in valve boxes to provide 2-inch clearance between the highest point of the valve and the bottom of the valve box lid.
4. Install valve tags in an acceptable manner indicating valve station and controller number.
5. Provide 12-inch minimum separation when valve boxes are grouped together, and align in a straight, parallel, even, and orderly manner.
6. Locate all boxes a minimum of 10 feet from striping of any field of play.
7. Locate valves in shrub/ground cover areas whenever possible.

C. Quick Coupler Valves:
1. Install as shown on the Drawings.
2. Quick coupling valves shall be installed in valve boxes to provide 2-inch clearance between the highest point of the valve cover and the bottom of the valve box lid.
3. Locate all boxes a minimum of 10 feet from striping of any field of play.

D. Control Wire:
1. Install control wire along main line, on as shown in Drawings.
2. Connect control wires to controller in sequential arrangement according to identification number in the Drawings. Label each controller station with permanent non-fading labels indicating valve identification number and controlled.
3. Bundle multiple wires with tape or ties at 20-foot intervals maximum. Do not tape wires in sleeves.
4. Make all splices in control valve boxes using only specified connectors.
5. Provide 36-inch wire coil at each remote control valve and at all mainline directional changes.
6. Install 2 spare control wires and one looped spare common wire to run by, and loop into, every remote control valve box of system. Terminate wires inside controller enclosure unconnected and clearly labeled as extra.
7. All wiring under paving shall be installed in a PVC pipe sleeve large enough to allow withdrawal and insertion of individual proposed wires and room for 12 additional wires.
8. Control wire under 2,000 feet in length shall be 14 gauge.
9. If control wire run is over 2,000 feet, shall be 12 gauge.

E. Tree Bubbler Assemblies:
1. Install in perforated pipe sump as shown on the Drawings.
2. Coordinate installation with planting operations to ensure timely and proper placement of heads.

F. Shrub Bubbler Assemblies
1. Install as shown on the Drawings.

3.6 FIELD QUALITY CONTROL

A. General:
1. Notify Owner's Representative for the following reviews, with minimum 2 working days' notice:

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a. Pressure testing mains prior to installing heads.
b. Coverage test prior to planting turf shrubs and or groundcover.
c. Pre-maintenance observation prior to acceptance of installed irrigation system.
d. Final observation prior to release of project to Owner.

2. Contractor shall provide all equipment and personnel required to conduct tests.
3. Provide up-to-date Project Record Drawings at each review.
4. If Owner's Representative is called out for review prior to the system being ready as specified, the contractor shall be back charged for the full cost of the review time, report, and travel.

B. Pressure Tests:
1. Testing shall occur with trenches open. Small amounts of backfill between fittings shall be allowed to prevent pipe displacement. All fittings shall be visible prior to testing.
2. Test all pressure supply lines under a minimum hydrostatic pressure of 125 psi. Pipe shall hold pressure for a period of 6 consecutive hours with no more than 5 psi loss in order to pass test.
3. Lateral lines shall be tested under full line pressure for a period of 1 hour prior to backfilling. Cap all heads and center load pipe between fittings prior to testing.
4. Correct all deficiencies revealed by tests to the satisfaction of the Owner's Representative.

C. System Flushing:
1. After lateral lines, swing joints and sprinkler heads are in place and connected, and prior to installation of sprinkler nozzles, thoroughly flush all lines with water to completely clean lines of debris.
2. Install sprinkler filters and nozzles only after lines have been flushed to the satisfaction of the Owner's Representative.

D. Coverage Tests:
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1. Perform coverage tests after systems are completed and operational, after finish grading as specified in Section 32 90 00 - Planting has been completed, but prior to any planting, in the presence of the Owner's Representative.
2. Correct all deficiencies to the satisfaction of the Owner's Representative prior to planting.
3. No overspray or runoff of recycled water is allowed on any non-approved use area.

3.7 BACKFILLING

A. General:
1. Backfill only after specified tests have been performed and accepted.
2. Clean trenches of debris and deleterious material before backfilling.
3. Backfill as shown on the Drawings with native material granular in nature and free from deleterious material rocks and clods 2" or larger.
4. Install pipe detection tape over entire run of mainline as shown in Drawings.
5. Compact trenching to 95 percent relative density under pavement and 85 percent relative density within planting areas.
6. Dress off and compact trench surfaces with finish grade in a manner to ensure no settling of trenches will occur. If settling occurs, contractor is to bring in additional topsoil, recompact and grade to be flush with adjacent finish grade.

3.8 ADJUSTING

A. Adjust and balance system to eliminate overspray, fogging or misting and as directed by Owner's Representative.

3.9 DEMONSTRATION

A. Instruct Owner's personnel in complete and proper operation and maintenance of system prior to Final Acceptance.

3.10 MAINTENANCE

A. Contractor shall service and maintain irrigation system during specified Landscape Maintenance Period as specified in Section 31 01 90 - Landscape and Site Maintenance.
B. The entire irrigation system shall be under fully accepted automatic operations for a period of 2 days prior to commencement of planting.
C. Final Acceptance and start of guaranty period shall occur no later than the end of the specified Landscape Maintenance Period.

3.11 FINAL REVIEW

A. Provide Owner's Representative with Record Documents and other specified closeout submittals prior to Final Review.

END OF SECTION 32 80 00

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SECTION 32 90 00 - PLANTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Landscaping as shown on the Drawings including, but not be limited to the following:
   1. Soil preparation.
   2. Fine grading of landscape areas.
   3. Turf planting.
   4. Plant material.
   5. Turf Establishment Period.
   6. Landscape Maintenance Period.

B. Related Requirements:
   1. Section 02 41 13 - Site Clearing and Demolition.
   2. Section 31 01 90 - Landscape and Site Maintenance.
   3. Section 32 80 00 – Irrigation.

1.2 REFERENCES

A. American Joint Committee on Horticulture Nomenclature (AJCHN): Standardized Plant Names.
B. American Association of Nurserymen, Inc. (AAN): American Standard for Nursery Stock.
C. Sunset Western Garden Book, Lane Publishing Company.
D. Agricultural Code of California.
E. State of California, Business and Transportation Agency, Department of Transportation (Caltrans) "Standard Specifications."

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1.3 ADMINISTRATIVE REQUIREMENTS

A. Submittal Procedures: Action and Informational Submittals shall be submitted in accordance with Section 01 33 00 - Submittal Procedures.

B. Coordination:
   1. Irrigation and drainage systems shall be inspected and tested before start of any Work of this Section. Before covering subsurface drains and any subsurface drainage weeps, Contractor shall inspect and be responsible for their performance.

1.4 ACTION SUBMITTALS

A. Plant Materials and Products:
   1. Thirty days prior to planting, submit 4 copies of documentation that plants specified have been ordered. Include names and addresses of suppliers.
   2. Substitutions: If substitutions are required, they shall be brought to the attention of the Owner's Representative, at time of submittal. Refer to Section 01 25 00 – Substitution Procedures for additional requirements.

B. Product Data:
   1. Manufacturer's descriptive literature for products proposed for use.
   2. Certified chemical analysis of the following:
      a. Fertilizers.
      b. Herbicides.

C. Samples: Submit 4 samples of the following in minimum 1-quart size "zip-lock" plastic bag:
   1. Soil amendment. Include current evaluation and sieve analysis.
   2. Decomposed Granite.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:
   1. Perform work in accordance with all applicable laws, codes, and regulation required by authorities having jurisdiction over such work and provide for all review and permits required by Federal, State, and local authorities in furnishing, transporting, and installing materials.
   2. Certificates of review required by law for transportation shall accompany invoice for each shipment of plants. File copies of certificates with the Owner's Representative after acceptance of material. Review by Federal or State governments at place of growth does not preclude rejection of plants at project site.
   3. Control of Work: Comply with Section 5 of the Standard Specifications.
   4. Control of Materials: Comply with Section 6 of the Standard Specifications.

B. Contractor shall employ on-site supervisor at all times during execution of the planting. Supervisor shall be thoroughly familiar and experienced with the materials and products being installed and proper methods of their installation. Notify the Owner's Representative immediately of changes in supervisory personnel.

C. Products and materials shall be new, first quality, and acceptable to the Owner's Representative.

D. Tree, Shrubs and Plants: Provide trees, shrubs and plants of quantity, size, genus, species and variety shown and scheduled for landscape work and complying with recommendations and requirements of ANSI Z60.1 "American Standard for Nursery Stock." Provide healthy, vigorous stock, grown in a recognized nursery in accordance with good horticultural practice and free of disease, insects, larvae, and other defects such as girdling or bound roots, knots, sunscald, injuries, abrasions, and disfigurement.

E. Analysis and Standards: Package standard products with manufacturers certified analysis. For other materials, provide analysis by recognized laboratory made in accordance with methods established by the Association of Official Agriculture Chemists, wherever applicable.

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F. Quality Review: The Owner's Representative will review trees and shrubs before planting for compliance with specified requirements for genus, species, variety, size and quantity. Owner's Representative retains right to further review trees and shrubs for size and condition of root systems, trunks, stems branches or structure, buds, and other required features, and to disqualify unsatisfactory or defective material at any time during the progress of work. Remove disqualified trees or shrubs immediately from project site and replace with materials acceptable to Owner's Representative.

1.6 DELIVERY, STORAGE, AND HANDLING

A. General:
   1. Ship plant material and seed with certificates of inspection required by governing authorities. Comply with regulations applicable to plant materials.
   2. Handle and store all products of this Section in such a manner as to protect them from damage at all times.
   3. Storage of products on-site shall be coordinated by the contractor in an orderly manner so as not to unnecessarily impede the work or reasonable use of project site.

B. Plants:
   1. Delivery: Coordinate with Owner's Representative. Provide proper identification for landscape labor force and vehicles at all times while on site.
   2. Storage: Coordinate with Owner's Representative. Provide exposure as required by plant variety and provide wind protection for all plants. Water regularly to maintain thorough moisture in root zone. Temporary, automatic irrigation system will be required at discretion of Owner's Representative if extended storage period becomes necessary. Protect dark colored plant containers from direct exposure to the sun.

3. Labeling: At least one plant of each variety or type shall be legibly labeled at all times clearly indicating correct plant name as indicated on Drawings. Labels shall be durable with waterproof ink.

C. Fertilizers:
1. Deliver in original, unopened containers with original labels intact and legible which state the guaranteed chemical analysis.
2. Fertilizer, lime, soil sterilant, and all other potentially toxic products shall not be stored with any other landscape materials.

D. Bulk Material:
1. Coordinate delivery and storage of bulk material with Owner's Representative.
2. Confine materials to neat piles in areas acceptable to the Owner's Representative.

1.7 FIELD CONDITIONS

A. Planting operations shall not be conducted under the following conditions, subject to the discretion of the Owner's Representative:
1. Freezing weather.
2. Excessive heat.
3. High winds.
4. Excessively wet conditions.

1.8 WARRANTY

A. Contractor shall warrant work executed and all materials provided or used under this Section shall be free of defects and poor workmanship for a period of 1 year after Final Acceptance.

B. Contractor wall warrant plant materials shall be in a healthy and thriving condition 1 year after Final Acceptance, unless it can be proven that the unhealthy or non-thriving material is due to causes other than the Contractor's materials or workmanship.

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1. Replace dead plants and plants not in vigorous condition immediately upon notification by Owner's Representative during Warranty Period.
2. Replaced plants shall be subsequently guaranteed by the Contractor for an additional year following date of replacement.
3. Repair defective materials and work shall be acceptable to the Owner's Representative.

1.9 TURF ESTABLISHMENT PERIOD

A. Turf Establishment period shall include complete rooting of turf and at least 2 mowings as specified herein, prior to the commencement of the specified Landscape Maintenance Period.

1.10 MAINTENANCE PERIOD

A. Refer to Section 31 01 90 - Landscape and Site Maintenance for information.

PART 2 - PRODUCTS

2.1 FERTILIZERS

A. General:
1. Fertilizers shall be of an acceptable brand with a guaranteed chemical analysis as required by USDA regulations.
2. Fertilizers shall be dry and (except plant tabs) free flowing.

B. Pre-Plant Fertilizer: Shall be of the following chemical analysis:

Nitrogen:	6 percent.
Phosphoric Acid:	20 percent
Soluble Potash:	20 percent

C. Post-Plant Fertilizer: Shall be of the following chemical analysis:

Nitrogen:	16 percent
Phosphoric Acid:	6 percent
Soluble Potash:	8 percent

D. Plant Tabs: 7-gram tabs designed for 12-month slow release with the following chemical analysis by weight; “Gro-Power” or equal:

Nitrogen:	12 percent
Phosphoric Acid:	8 percent
Soluble Potash:	8 percent
Humus:	20 percent
Humic Acid:	4 percent
Sulfur:	3.5 percent
Iron:	2 percent
Micronutrients	

2.2 PLANTS

A. General:
1. Plants shall conform to the species and minimum sizes shown on the Drawings.
2. Quantities shown on the Drawings are for the Contractors convenience only. Contractor shall provide plant material to fulfill the intent of the Planting Plan at the discretion of the Owner’s Representative.

B. Condition: Plants shall conform to the following minimum requirements:
1. Nursery grown unless otherwise specified.
2. Supplied in appropriate container, balled and burlapped, or bare root as specified on Drawings.

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2.3 TURF SOD

A. Harvest and Delivery:
1. Harvest from source and deliver to project site within 24 hours.
   a. Deliver only as much sod as can be installed in one day's work.
   b. Sod not transplanted within this time period shall be reviewed prior to installation.
2. Comply with requirements in "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in Turfgrass Producers International’s (TPI) "Guideline Specifications to Turfgrass Sodding."
3. Protect sod from breakage and drying.

B. Sod shall be as follows:
1. Match existing grass.
2. Sod shall have a 3/4 inch cut or thickness.
3. Sod shall be large roll cut.
4. Sod shall have a peat or sand / peat base.

C. Source: Delta Bluegrass, West Coast Turf, Pacific Sod, or equal.

2.4 HERBICIDES

A. Pre-Emergent: “Ronstar-G” pelletized, “Surflan” liquid, or equal.

B. Other Herbicides: Submit for review and accepted by Owner’s Representative prior to use.

2.5 ADDITIONAL MATERIALS

A. Water: Clean, fresh, and free of substances or matter which could inhibit vigorous growth of plants.

B. General: Products and materials shall be new, first quality as acceptable to the Owner's Representative.
C. Tree Stakes and Ties: As shown and specified on the Drawings.
D. Root Barriers: Model #UB 24-2 "Universal Barrier" by Deep Root Partners L.P, 800-458-7668, or equal.
E. Weed Barrier: "Pro Weed Barrier" Model 24003080 DeWitt Co., Sikeston MO, 800-888-9669, or equal.
   1. Roll Size: 12 feet by 250 feet.
   2. Anchorage: 8 inch jute staples.
F. Decomposed Granite – Fines (At Planter areas)
   1. Model/Color: California Gold
   2. Depth: 2"
   3. Manufacturer: Southwest Boulder & Stone, or approved equal
G. Rock Rubble
   1. Model/Color: Baja Cresta Rubble
   2. Size: 4"-8"
   3. Manufacturer: Southwest Boulder & Stone, or approved equal
H. Crushed Rock
   1. Model/Color: Apache Sunset Crushed Stone
   2. Size: 3/4"
   3. Manufacturer: Southwest Boulder & Stone, or approved equal
I. Boulders (Small)
   1. Model/Color: Baja Cresta Boulders
   2. Size: 2'
   3. Manufacturer: Southwest Boulder & Stone, or approved equal
J. Boulders (Large)
   1. Model/Color: Baja Cresta Boulders
   2. Size: 4'
   3. Manufacturer: Southwest Boulder & Stone, or approved equal

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PART 3 - EXECUTION

3.1 PREPARATION

A. Make provisions and take necessary precautions to protect existing and new improvements from damage during execution of planting work.
B. Initial Preparations:
   1. Prior to beginning of planting, thoroughly cross-rip, with second rip shall be performed at 90 degrees to first rip, planting area soil to a depth of twelve 12 inches.
   2. Remove all rocks, sticks, clods, debris, and other deleterious materials over one-half (1/2) inch in diameter from top 6 inches of soil.
   3. Float, rake, and roll all planting areas as necessary to establish smooth, clean, non-yielding planting beds.
   4. Prevent erosion of the soil between completion of soil preparation and planting.
C. Concrete Mowbands: Install in accordance with the Drawings and repeat specified initial preparations as necessary.

3.2 SOIL FINISH GRADES

A. Planting Area Finish Grades:
   1. Rake planting areas smooth and set finish grades as follows.

2. Finish grades of planting areas shall be 1 inch below adjacent paving, headers, utility boxes, irrigation boxes, and other in-grade items. Finish grade slopes shall be consistent.
3. Drainage structures, including catch basins, area drains, and concrete swales, shall be flush with finish grade to allow for proper drainage. Soil shall be sloped consistently from spot elevations provided to drain.
4. In planting areas to receive decomposed granite, depth of decomposed granite shall taper within 3 feet of paving edge to a depth from 2 inches to 1 inch at edge of pavement.
5. Irrigation head elevation relative to finish grade shall be installed as shown.

3.3 SOD INSTALLATION

A. General:
1. Soil preparation and fine grading shall be as specified.
2. Prior to sod installation, roll turf bed until a smooth, firm surface with uniform grade has been produced.
3. The turf bed shall be reviewed and accepted by the Owner's Representative prior to sod installation.

B. Placement:
1. Sod shall be unrolled into place with careful attention to tight joints with no overlapping or stretching.
2. Stagger the joints in each new row like rows of bricks with a minimum 18 inch minimum stagger. Use a sharp knife for shaping around trees, flower beds or borders. Immediately after placement, soak sod areas with water.
3. Roll sod after watering to smooth out bumps and air pockets, and roll again if sod is not even.
4. Water frequently for the first 10 to 14 days with enough water to saturate soil to a depth of 4 inches.
5. Do not allow sod dry out.

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C. Provide and install temporary fencing around completed sod areas if not protected by other fencing. Use 6 foot high temporary fence for protection.

D. Refer to Section 31 0190 – Landscape and Site Maintenance for mowing and maintenance procedures. As applicable, the Contractor shall remove sod, re-grade any areas that have been rutted from mowers or otherwise damaged, and replace sod to the satisfaction of the Owner's Representative.

E. Until project Final Acceptance, should it become evident that certain sod areas have not grown, re-sod the areas immediately with sod of the same type as originally used and maintain as specified.

3.4 TURF ESTABLISHMENT PERIOD

A. Prior to commencement of specified maintenance period, turf shall be completely germinated and established, and a minimum of 2 mowings shall have taken place as follows:
1. First mowing shall take place when turf has reached a height of 3 inches and turf shall be mown to 2 inches. Submit written request to the Owner's Representative for acceptability of initiating first mowing.
2. Thereafter, turf shall be mown weekly until turf is sod-like in appearance and quality, and all other contract requirements shall be fulfilled prior to allowing the maintenance period to commence.
3. Contractor will receive a written notice of acceptance of turf establishment and to commence with landscape maintenance period.
4. Owner's Representative will approve any phasing of turf areas to commence into the maintenance period. Areas may be approved in stages but will require contiguous areas of turf that are completely established.

3.5 TREE, SHRUB AND GROUND COVER PLANTING

A. These areas shall receive specified topsoil and soil amendments prior to commencing with tree, shrub and ground cover planting.

B. Layout: Coordinate layout of plants with Owner's Representative for review and acceptance.

C. Plant Pit Excavation:
   1. Excavate pits to sizes indicated in Drawings.
   2. Thoroughly scarify all sides of plant pits to remove "auger slick" and encourage root penetration.

D. Set trees and shrubs in pit on tamped backfill base as per Details. Set plumb and face for best appearance. Thoroughly scarify all plant root balls to eliminate any circling roots and to encourage root growth. Set plant so root crown will level with or be slightly above surrounding grade after settlement.

E. Backfilling:
   1. Backfill mix for 1 gallon size and larger shall consist of 100 percent native site soil with plant tabs added per manufacturer's recommendations.
   2. Tamp backfill mix under and around root balls.
   3. Flood plant pit when half backfilled; allow to drain.
   4. Complete backfilling. Tamp as necessary, do not over compact.

F. Palm Pit Backfilling:
   1. Fill the hole with washed plaster sand.
   2. Water in as you fill hole with sand to wash the material around the exposed roots.
   3. Avoid leaving any air pockets or voids that will allow the roots to dry out.
   4. The sand backfill should ensure good drainage plus provide rigidity so you may not have to brace the tree.

G. Watering:
   1. Thoroughly water plants immediately after planting.
   2. Construct water basins as specified in Drawings.

H. Finish Grade Restoration: Restore finish grades by hand raking. Dispose of excess subgrade soil.

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3.6 HERBICIDE APPLICATION

A. Apply in accordance with manufacturers' recommendations.

B. Apply pre-emergent herbicide to soil prior to placement of decomposed granite.

3.7 DECOMPOSED GRANITE

A. Spread evenly and compact in 2-inch lifts in designated areas.

B. Water lightly and compact with roller.

C. Spread additional material, roll and compact to establish even finished grade at specified elevation.

3.8 FIELD QUALITY CONTROL

A. New turf areas shall be fenced off during turf establishment and specified Landscape Maintenance Period subject to the discretion of the Owner's Representative.

B. The Owner's Representative will review and accept the following prior to the Contractor proceeding with subsequent work:
   1. Preparation: At completion of finish grading and prior to planting, grading tolerances and soil preparation will be checked for conformance to Contract Documents.
   2. Layout of plants, header board, and other major items shall be as directed and accepted by the Owner's Representative.
   3. Pre-Maintenance Review: At completion of planting, work shall be reviewed for conformance with Contract Documents. Acceptance shall mark beginning of the specified maintenance period. If acceptance is not given, a punch-list of items requiring attention

will be issued to the Contractor. One more review will be allowed after Contractor certifies in writing that the punch-list has been completed. Punch-list shall be completed to the satisfaction of the Owner's Representative prior to commencement of the Specified Maintenance Period.

C. Costs incurred from repeat reviews required due to Contractor not being prepared and other non-conformance with Contract Documents will be back charged to the Contractor.

END OF SECTION 32 90 00

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SECTION 33 10 00 – WATER UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.

B. Privately maintained on-site water distribution system for water services from the property line and within the fire access lane.

C. The work shall include the provision of all labor, materials, equipment and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

1.2 RELATED SECTIONS

A. Section 31 23 33 – Trenching and Backfilling.

1.3 RELATED DOCUMENTS

A. California Building Code: Chapter 33 – Site Work, Demolition and Construction.

B. Construction Management Plan prepared by_____.

C. American Society for Testing and Materials (ASTM) Standards

1. D1784: Specifications for Polyvinyl Chloride (PVC) Compounds and Chlorinated Polyvinyl Chloride (CPVC)
2. D3139: Specification for Joint for Plastic Pressure Pipes Using Flexible Elastomeric Seals
3. F477: Specifications for Elastomeric Seals for Joining Plastic Pipe

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D. American Water Works Association (AWWA) Specifications:

1. 104: Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. C110: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm) for Water.
3. C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
4. C115: Flanged Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges.
5. C153: Ductile- Iron Compact Fittings for Water Service.
6. C500: Metal-Seated Gate Valves for Water Supply Service.
7. C502: Dry-Barrel Fire Hydrants.
8. C503: Wet Barrel Fire Hydrants.
9. C504: Rubber Seated Butterfly Valves.
10. C509: Resilient-Seated Gate Valves for Water Supply Service.
11. C510: Double Check Valve Backflow-Prevention Assembly.
12. C511: Reduced-Pressure Principle Backflow-Prevention Assembly.
13. C550: Protective Epoxy Interior Coatings for Valves and Hydrants.
14. C605: Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings.
15. C651: Disinfecting Water Mains.

16. C900: Polyvinyl Chloride (PVC) Pressure Pipe and Fittings, 4 In. Through 12 In. (100mm Through 300mm) for Water Distribution.
17. C907: Polyvinyl Chloride (PVC) Pressure Fittings for Water – 4 In. through 8 In. (100 mm Through 200 mm).
18. C908: PVC Self-Tapping Saddle Tees for Use on PVC Pipe.
19. M23: PVC Pipe – Design and Installation.
20. M41: Ductile-Iron Pipe and Fittings.

E. 2007 California Fire Code

F. California Building Code

1.4 DEFINITIONS

A. DI: Ductile iron.

B. NFPA: National Fire Protection Association.

C. NSF: National Sanitation Foundation.

D. PCC: Portland cement concrete.

E. PVC: Polyvinyl Chloride.

F. UL: Underwriters Laboratory.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

A. Minimum Internal Pressures:

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1. Working Pressures: In accordance with reviewing agency having jurisdiction
2. Test Pressure, 200-psi, or in accordance with the reviewing agency having jurisdiction.

B. External Load: Earth load indicated by depth of cover plus AASHTO H20 live load unless indicated otherwise.

1.6 SUBMITTALS

A. Submittal procedures shall be as outlined in the Division 1 Specifications.

B. Product Data for the following:

1. Piping materials and fittings.
2. Pipe couplings.
3. Flexible pipe fittings.
4. Restrained pipe fittings.
5. High deflection fittings/ball joints.
6. Expansion joints.
7. Flexible expansion joints.
8. Gate valves.
9. Check valves.
10. Air and vacuum relief valves.
11. Ball valves.
12. Fire hydrants.

13. Post indicator valves.
14. Fire department connections.
15. Backflow preventers.
16. Precast valve boxes and box covers.
17. Double check detector assembly.

C. Shop drawings: Include plans, elevations, details and attachments.
1. Precast and cast in-place vaults and covers.
2. Wiring diagrams for alarm devices.

D. Field Test Reports: Indicate and interpret test results for compliance with the Project requirements.

1.7 QUALITY ASSURANCE

A. Comply with requirements of utility supplying water. Do not operate existing valves or tap existing piping without written permission and/or presence of utility company representative.

B. Comply with the following requirements and standards:
1. NSF 61: "Drinking Water System Components-Health Effects" for materials for potable water.
2. NFPA 24: "Installation of Private Fire Service Mains and Their Appurtenances" for materials, installations, tests, flushing, and valve and hydrant supervision.
3. NFPA 70: "National Electric Code" for electrical connections between wiring and electrically operated devices.

C. Provide listing/approval stamp, label, or other marking on piping and specialties made to a specified standard.

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1.8 MATERIAL DELIVERY, STORAGE AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:
1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set Valves in best position for handling. Set valves closed to prevent rattling.

B. Deliver piping with factory-applied end-caps. Maintain end-caps through shipping, storage and handling to prevent pipe end damage and to prevent entrance of dirt, debris and moisture.

C. Handling: Use slings to handle valves and fire hydrants whose size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. During Storage: Use precautions for valves, including fire hydrants according to the following.
1. Do not remove end protectors, unless necessary for inspection, then reinstall for storage.
2. Protection from Weather: Store indoors and maintain temperature higher than ambient dew-point temperature. Store indoors and maintain temperature higher than ambient dew point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

E. Do not store plastic pipe and fittings in direct sunlight.

F. Protect pipe, fittings, flanges, seals and specialties from moisture, dirt and damage.

G. Protect linings and coatings from damage.

H. Handle precast boxes, vaults and other precast structures according to manufacturer's written instructions.

I. Protect imported bedding and backfill material from contamination by other materials.

1.9 COORDINATION

A. Coordinate connection to existing water mains with water utility supplying water.

B. Coordinate piping materials, sizes, entry locations, and pressure requirements with building domestic water distribution piping and fire protection piping.

PART 2 - PRODUCTS

2.1 GENERAL

A. Contractor shall confirm that all water system products and materials conform to the local agency standards and requirements having jurisdiction prior to ordering and installation.

2.2 SMALL-SIZE SERVICE PIPES

A. Copper Pipe: Sizes ¾-inch through 2-inch.
1. Pipe and Fittings: ASTM B 88, Type K, seamless water tube, annealed.
2. Joints: Restrain by couplings.

B. PVC Pipe: Sizes1/8-inch through 3 inches.
1. Pipe and Fittings: ASTM D 1785, Schedule 40
2. Joints: Restrain with solvent cement. Do not use threaded pipe.
3. Solvent Cement: ASTM D2564.

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2.3 LARGE-SIZE SERVICE AND DISTRIBUTION PIPES

A. PVC Pipe: Sizes 4-inch through 48-inch.
1. Pipe:
   a. 4-inch through 12-inch: AWWA C900.
   b. 14-inch through 48-inch: AWWA C905.
2. Fittings:
   a. DI Standard: AWWA C110, sizes 4-inch through 48-inch.
   b. DI Compact: AWWA C153, sizes 4-inch through 24-inch.
3. Unrestrained Joints:
   a. Push-On Bell and Spigot Joint: AWWA C900.
4. Restrained Joints:
   a. Push-On Bell and Spigot Joint: Harness assembly as manufactured by Ebaa Iron (Eastland, Tx) (Tel. 800-433-1716) or approved equal.
   b. Plain End PVC to DI Mechanical Joint: Ebaa Iron (Eastland, Tx) (Tel. 800-433-1716) or approved equal.
5. Steel or Ductile Iron Couplings:
   a. Plain End Pipe to Plain End Pipe: Ductile iron or steel bolted couplings, manufacturer's shop coating with low alloy steel bolts and nuts. Steel couplings to conform to AWWA C219. Smith- Blair, Inc, (Texarkana, AR) (Tel. 501-773-5127), Dresser (Bradford, PA) (Tel.-814-

368-3131) or approved equal.

b. Plain End Pipe to DI or Steel Flanged Pipe: Ductile iron or steel bolted flanged coupling adapters, manufacturer's shop coating with low alloy steel bolts and nuts. Steel flanged couplings to conform to AWWA C219. Smith-Blair, Inc, (Texarkana, AR) (Tel. 501-773-5127), Dresser (Bradford, PA) (Tel.-814-368-3131) or approved equal.

6. PVC Couplings
   a. Unrestrained Plain End to Plain End Pipe: AWWA C900, as manufactured by CertainTeed (Valley Forge, PA) (Tel. 610 341-6820) or approved equal.
   b. Restrained Plain End to Plain End Pipe: AWWA C900, "Certa-Lock" as manufactured by CertainTeed (Valley Forge, PA) (Tel. 610 341-6820) or approved equal.

2.4 HIGH DEFLECTION FITTINGS/BALL JOINTS

A. Plain End Pipe: Xtra Flex Restrained Joint High Deflection Fittings, 4-inch through 24-inch, U. S. Pipe, (Birmingham, AL) (Tel. 205-254-7442) or approved equal.

B. Mechanical or Flanged Joint: Flex 900, 4-inch through 12-inch, Ebaa Iron Sales, (Eastland, TX) (Tel. 800- 433-1716) or approved equal.

2.5 EXPANSION JOINTS

A. TR Flex Joints: TR Flex Telescoping Sleeve, 4-inch through 64 inches, U. S. Pipe, (Birmingham, AL) (Tel. 205-254-7442).

B. Mechanical or Flanged Joint: Ex-Tend 200, 4-inch through 36-inch, EBAA Iron Sales, (Eastland, TX) (Tel. 800-433-1716) or approved equal.

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2.6 FLEXIBLE EXPANSION JOINTS

A. Plain End to Plain End Pipe: "Xtra Flex," sizes 4-inch through 24-inch, U. S. Pipe, (Birmingham AL) (Tel. 205-254-7442) or equal.

B. Flanged or mechanical Joint: "Flex-Tend," sizes 3-inch through 48-inch, Ebaa Iron (Eastland TX) (Tel. 800-433-1716) or equal.

C. Flanged Joint: Starflex, Series 500, Star Pipe Products, (Tel. 800-999-3009) or equal.

2.7 GATE VALVES

A. Provide on lines greater than 2-inches and less than or equal to 10-inches.

B. Valves, 3-Inch through 20-Inch: AWWA C509, resilient-seated, non-rising stem, gray or ductile-iron body and bonnet, with bronze or gray or ductile-iron gate, bronze stem and square stem operating nut unless noted otherwise. All bolts, nuts and washers, except operating nut, shall be stainless steel. Stem operating nut to be 2-inches square and open counter-clockwise. Stem extensions shall be installed to bring the stem operating nut to within 2-feet of finish grade where the depth from finish grade to the stem operating nut exceeds 4-feet. Equip valves in pump stations and other interior or vault installations with hand- wheels. Provide protective epoxy interior and exterior coating according to AWWA C550 and manufacturer's recommendations.

C. Valves for use with Flanged Pipes: Valves for use with flanged pipes shall be cast with Class 125 flanges, dimensions and drilling shall conform to ASA B 16.1. Flanged bolt holes shall be spot faced if flanged fillets interfere with bolt head nuts.

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Mueller Company (Decatur, IL) (Tel.800-423-1323).
   2. M&H Valve Company (Anniston, AL) (Tel. 205-237-3521).
   3. Crane Company (New York, NY).

E. Valve Box and Cover: 9-inch minimum diameter PCC box with extensions of length required for depth of bury of valve, and cast iron or ductile iron cover with lettering "WATER". Both the box and the cover shall be rated for AASHTO H20 loading.

2.8 AIR RELEASE, AIR/VACUUM AND COMBINATION AIR VALVES

A. AWWA C512, specific type of valve, size, details and valve box as indicated.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:

C. Apco Valves, Valve and Primer Corporation (Schaumburg, IL) (Tel. 708-529-9000).

D. Crispin Valve (Berwick, PA) (Tel. 800-247-8258).

2.9 SWING CHECK VALVES

A. Valves 2-Inch through 24-Inch: AWWA C508, details as indicated.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Mueller Company (Decatur, IL) (Tel.800-423-1323).
   2. M&H Valve Company (Anniston, AL) (Tel. 205-237-3521).

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2.10 BALL VALVES

A. Valves 6-Inch through 48-Inch: AWWA C507, details as indicated.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
   1. Crane Company (New York, NY).

2.11 SERVICE CONNECTIONS AND WATER METERS

A. Any new service connection and water service, if required, shall be furnished in conformance with the local agency and requirements having jurisdiction.

2.12 FIRE HYDRANTS

A. Wet Barrel: AWWA C503, details as indicated.

B. Dry Barrel: AWWA C502, details as indicated.

2.13 REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER

A. Provide as indicated and as required by State or local agency.

B. General: AWWA C511, with OS gate valve on inlet and outlet, and strainer on inlet. Include test cocks and

pressure-differential relief valve with ASME A112.1.2 air gap fitting located between 2 positive-seating check valves for continuous-pressure application.

C. Body:
1. 2-Inch and Smaller: Bronze with threaded ends.
2. 2-1/2-Inch and Larger: Bronze, cast iron steel, or stainless steel with flanged ends.

D. Interior Lining: AWWA C550, epoxy coating for cast iron or steel bodies.

E. Interior Components: Corrosion-resistant materials.

F. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
1. Ames Company (Woodland, CA) (Tel. 916-666-2493).
2. Febco, CMB Industries, Inc. (Fresno, CA) (Tel. 559-252-0791).
3. Hersey Products, Inc. (Dedham, MA) (Tel. 617-326-9400).
4. Watts (North Andover, MA) (Tel. 978-688-1811).

2.14 DOUBLE CHECK DETECTOR ASSEMBLY

A. FM approved or UL listed, with OS&Y gate valve on inlet and outlet, and strainer on inlet. Include two positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer, for continuous pressure application.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
1. Ames Company (Woodland, CA) (Tel. 916-666-2493).
2. Febco, CMB Industries, Inc. (Fresno, CA) (Tel. 559-252-0791).
3. Watts (North Andover, MA) (Tel. 978-688-1811).

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2.15 POST INDICATOR VALVE

A. General: UL 789, FM approved, vertical-type, cast-iron body with operating wrench extension rod, and adjustable cast-iron barrel of length required for depth of bury of valve. Review fire department connection with agency having jurisdiction. Check hose threads and all sizes with fire department.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:
1. Mueller Co. (Decatur, IL) (Tel.800-423-1323).
2. Clow Corporation (Oskaloosa, IA).

2.16 FIRE DEPARTMENT CONNECTION

A. Exposed, Freestanding Fire Department Connection, if required: UL 405, cast brass body with threaded inlets according to NFPA 1963 and matching local fire department hose threads and threaded bottom outlet. Include lugged caps, gaskets and chains; lugged swivel connections and drop clapper for each hose-connection inlet; 18-inch high brass sleeve; and round escutcheon plate. Four 2-1/2-inch NPS inlets and 6-inch NPS outlet.

2.17 UNDERGROUND VAULTS/PITS

A. General: Portland cement concrete, precast or cast-in-place as indicated.

B. Portland Cement Concrete and Reinforcing Steel: Section 32 05 23 – Cement and Concrete for Exterior Improvements.

C. Access Openings: As indicated.

D. External Load: Earth load plus AASHTO H20 live load if located in paved areas.

E. Lids: Bolt down type.

2.18 TRACER WIRE

A. General: Minimum #12 AWG stranded copper wire with blue THW, THWN, or THHN rated insulation.

2.19 WARNING TAPE

A. General: Non-detectable 3-inch warning tape made of solid blue film with continuously printed black-letter message reading "CAUTION—WATER LINE BURIED BELOW."

2.20 PCC THRUST BLOCKS

A. Conform to City of Dublin Standard Detail WA-5 for Thrust Block requirements and installation.

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PART 3 - EXECUTION

3.1 PIPE INSTALLATION

A. General: Install pipe, fittings, and appurtenances utilizing best practices, manufacturer's instructions, and in accordance with the following:

1. PVC pipe: AWWA M23 and AWWA C605.

B. Pipe Depth and Trench Configuration: Conform to elevations, profiles and typical trench section(s) indicated.

C. Excavation, Bedding, Backfill, and Compaction: Section 31 23 33 – Trenching and Backfilling.

D. Handling: Carefully handle during loading, hauling, unloading and placing operations to avoid breakage or damage. Use strap type slings for lifting and placing; no chains or hooks will be permitted. Comply with manufacturer's recommendations.

E. Laying: Before lowering pipe into the trench, remove all stakes, debris, loose rock and other hard materials from the bottom of the trench. Lay accurately in conformance with lines and grades indicated. Lay pipe on a bed of bedding material specified and prepared by handwork, dug true to grade. Furnish firm bearing for pipe throughout it's entire length with bell holes provided at the ends of each pipe length of sufficient size to permit making up the particular type of joint being used. Adjust pipe to line and grade by scraping away or filling and tamping material under the body of the pipe for the entire pipe length and not by blocking or wedging. After final positioning, hold pipe in place in trench with backfill material placed equally on both sides of the pipe at as many locations as required to hold the pipe section in place.

F. Curved Alignment: When necessary to conform to the alignment specifically indicated, lay pipe on a curved alignment by means of asymmetrical closure of joints or bending of the pipe barrel. If necessary, use shorter than the standard lengths of pipe to achieve curvature specified. Do not exceed the recommendations of the pipe manufacture for deflections at the joints or pipe bending.

G. Closure: Close open ends of pipes and appurtenance openings at the end of each days work or when work is not in progress.

3.2 CONNECTING TO EXISTING MAINS

A. Pressure Tap Connections: Perform in accordance with the requirements of the owner of the system being tapped. Maintain a positive pressure flow from the main being tapped to the tapping device to flush plastic chips, metal ribbons, etc. into the tapping devise and not into the pipe being tapped.

B. Other Connections: As indicated and in accordance with the requirements of the owner of the line being connected to.

3.3 ANCHORAGE INSTALLATION

A. Mechanically Restrained Joints: Install where indicated for lengths indicated in accordance with manufacturer's instructions.

B. PCC Thrust Blocks: Install where required and as indicated. Bearing area indicated is to be against undisturbed earth. Allow a minimum of 24-hours curing time before introducing water into the pipeline and allow a minimum of 7-days curing time before pressure testing.

3.4 HIGH DEFLECTION FITTINGS/BALL JOINTS, EXPANSION JOINTS, AND FLEXIBLE EXPANSION JOINTS

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A. Install as indicated and in accordance with the manufacturers recommendations.

3.5 VALVE INSTALLATION

A. Install all valves in accordance with the manufacturer's instructions and the following:
   1. General:
      a. Gate Valves: Appendix A of AWWA C509.
      b. Butterfly Valves: Appendix A of AWWA C504.
   2. Joints:
      a. Valves on PE and PVC Pipe: Mechanical joint valves for buried locations. Flanged-end valves for installation in vaults/pits.

3.6 SERVICE CONNECTIONS INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system.

3.7 WATER METER INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system

3.8 FIRE HYDRANT INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system and the fire department.

3.9 REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system and the local health department requirements.

3.10 DOUBLE CHECK DETECTOR ASSEMBLY INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system and the fire department.

3.11 POST INDICATOR VALVE INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system and the fire department.

3.12 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install as indicated and in accordance with the requirements of the owner of the system and the fire department.

3.13 UNDERGROUND VAULT/PIT INSTALLATION

A. Install as indicated.

B. Excavation and Backfill: Section 31 23 33 – Trenching and Backfilling.

3.14 TRACER WIRE INSTALLATION

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A. Install on trench bottom under the vertical projection of the pipe to protect it in all installations.

B. Form a mechanically and electrically continuous line throughout the pipeline, extending to the nearest valve or other pipeline appurtenance designated by the owner of the system or the Owner. Extend the wire up the outside of the valve box/riser and cut a hole that is 8-inches from the top, extend a 12-inch wire lead to the inside of the box. At other pipeline appurtenances, designated by the owner of the system or the Owner, terminate the 12-inch wire lead inside the enclosure.

C. Splice wire with a splicing device consisting of and electro-tin plated seamless copper sleeve conductor. Install as recommended by the manufacturer. Wrap splices and damaged insulation with electrician's tape.

3.15 WARNING TAPE INSTALLATION

A. Install tape approximately 1-foot above and along the centerline of the pipe.

B. Where tape is not continuous, lap tape ends a minimum of 2-feet.

3.16 HYDROSTATIC PRESSURE AND LEAKAGE TEST

A. General:

1. Unless otherwise directed by the City and/or owner of the system, provide leakage test in accordance with the following criteria:
2. Provide all necessary materials and equipment, including water.
3. Backfill all trenches sufficient to hold pipe firmly in position.
4. Allow time for thrust blocks to cure prior to testing.

5. Flush all pipes prior to testing to remove all foreign material.
6. Perform pressure and leakage test concurrently.
7. Test pressure: See Subsection titled "System Performance Requirements."
8. Apply test pressure by means of a pump connected to the pipe.
9. Base test pressure on the elevation of the lowest point in the line.
10. Fill each closed valve section or bulk-headed section slowly. Expel air from section being tested by means of permanent air vents installed at high points or by means of temporary corporation cocks installed at such points. Remove and plug the temporary corporation cocks at the conclusion of the test.
11. Allow water to stand in the pipe for 24 hours before test pressure is applied.
12. Allow the system to stabilize at the test pressure before conducting the leakage test.
13. Do not operate valves in either the opening or closing direction at differential pressures above the valves rated pressure.
14. Maintain test pressure as specified for type of pipe being tested.
15. Pressure Test: Examine any exposed pipe, fittings, valves, hydrants and joints during the test, if no leaks are observed the section of line has passed the pressure test. If leaks are observed, repair any damaged or defective pipe, fittings, valves, or hydrants, and repeat the pressure test.
16. Leakage Test: Perform as specified hereafter for the type of pipe being installed.

B. PVC Pipe Leakage Test: Perform in accordance with AWWA M23. Selected requirements of AWWA M23 are repeated as follows:

1. Maintain the test pressure, +/- 5 psi, for a minimum of two hours.
2. No piping will be accepted if the leakage is greater than that determined by the following formula: 3. L = (N x D x P1/2)/7,400
4. L = Allowable leakage, gallons per hour.
5. N = Number of joints in the length of the pipeline tested.
6. D = Nominal diameter of pipe, inches.
7. P = Average test pressure during the leakage test, pounds per square inch (gauge).

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3.17 DISINFECTION

A. All New Pipelines shall be disinfected in accordance with one of the three methods specified in AWWA C651 and the following:

1. Disinfect after pressure and leakage test have been performed and accepted.
2. The method used shall be at the Contractor's option, unless specified by the owner of the water system.
3. Engage the services of a commercial testing laboratory, approved by the owner of the water system, to perform the bacteriological tests specified in Section 5.1 of AWWA C651. Direct the testing laboratory to send the original report of the bacteriological testing to the owner of the water system. Should the laboratory report show that any sample taken was not acceptable, repeat the sterilization process shall until a satisfactory sterilization is accomplished.
4. Lawfully dispose of the chlorinated water.

END OF SECTION 33 10 00

SECTION 33 40 00 - STORM DRAINAGE UTILITIES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the Work of this Section.

B. Privately maintained on-site storm drainage distribution system within emergency access vehicle lane.

C. Installation of privately maintained underdrains and appurtenances.

D. The work shall include the provision of all labor, materials, equipment, and apparatus not specifically mentioned herein or noted on the plans, but which are incidental and necessary to complete the work specified.

1.2 RELATED SECTIONS

A. Section 31 2333 – Trenching and Backfilling.

1.3 RELATED DOCUMENTS

A. Construction Management Plan prepared by_____.

B. AASHTO:

1. M 199: Precast Reinforced Concrete Manhole Sections.
2. M 252: Corrugated Polyethylene Drainage Tubing.
3. M 294: Corrugated Polyethylene Pipe, 12 to 24-inch Diameter.

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C. ASTM:

1. A 74: Cast Iron Soil Pipe and Fittings.
2. A 615/A615M: Deformed and Billet-Steel Bars for Concrete Reinforcement.
3. C 443: Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
4. C 478: Precast Reinforced Concrete Manhole Sections.
5. C 564: Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
6. C 1173: Flexible Transition Couplings for Underground Piping Systems.
7. D 2321: Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity Flow Applications.
8. D 2564: Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
9. D 3034: Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
10. D 4101: Specifications for Propylene Injection and Extrusion Materials.
11. F 477: Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
12. F 656: Primers for Use in Solvent Cement Joints of Poly (Vinyl Chloride) (PVC)Plastic Pipe and Fittings.
13. F 679: Specification for Poly (Vinyl Chloride) (PVC) Large Diameter Plastic Gravity Sewer Pipe and Fittings.
14. F-1336: Poly (Vinyl Chloride) (PVC) Gasket Sewer Fittings.

D. AWWA:

1. C104: Cement Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
2. C105: Polyethylene Encasement for Ductile-Iron Pipe Systems.
3. C110: Ductile-Iron and Gray-Iron Fittings, 3 In. Through 48 In. (76 mm Through 1,219 mm) for Water.
4. C111: Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
5. C150: Thickness design of Ductile Iron Pipe.
6. C151: Ductile-Iron Pipe, Centrifugally Cast, for Water.
7. C153: Ductile-Iron Compact Fittings for Water Service.
8. M41: Ductile Iron Pipe and Fittings.

E. Caltrans Standard Specifications:
1. Section 51, Concrete Structures.
2. Section 52, Reinforcement.
3. Section 70, Miscellaneous Facilities.
4. Section 72, Slope Protection.
5. Section 75, Miscellaneous Metal.

F. California Building Code.
1. Section 1806A.11 – Pipes and Trenches.
2. Section 1133B.7.2 – Gratings.

G. California Plumbing Code.

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1.4 DEFINITIONS

A. AASHTO: American Association of State Highway and Transportation Officials.

B. ASTM: American Society for Testing Materials.

C. AWWA: American Water Works Association.

D. HDPE: High-density polyethylene.

E. NPS: Nominal pipe size.

F. PVC: Polyvinyl chloride.

G. RCP: Reinforced concrete pipe.

1.5 SUBMITTALS

A. Submittal procedures shall be as outlined in the Division 1 Specifications.

B. Product Data Shop Drawings, for the following:
1. Piping materials and fittings.
2. Special pipe couplings.
3. Polymer-concrete, channel drainage systems (trench drains).
4. Joint sealants.
5. Plastic area drains.
6. Cleanout plugs or caps.
7. Precast concrete catch basins, inlets, curb inlets, junction structures and area drains, including

frames and grates.

8. Precast clean out boxes and box cover.
9. Concrete, metal and plastic flared end sections.
10. Storm drain pumps and wet well manholes. This includes all appurtenances.

C. Design Mix Reports and Calculations: For each class of cast in place concrete.

D. Field Test Reports: Indicate and interpret test results for compliance with performance.

1.6 QUALITY ASSURANCE

A. The engineer may require manufacturer's or supplier's certificates showing conformance with this specification to be delivered with each shipment of material delivered to the job site.

B. Class of pipe requirements shown or called for on the plans shall be the minimum acceptable.

1.7 DELIVERY, STORAGE AND HANDLING

A. Do not store plastic structures, pipe and fittings in direct sunlight.

B. Protect pipe, fittings, and seals from dirt and damage.

C. Handle precast concrete pipe, manholes and other precast structures according to manufacturer's written instructions.

D. Protect imported bedding and backfill material from contamination by other materials.

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PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. HDPE Pipe and Fittings: 4-Inch and Larger, outside of the Public Right-of-Way.
   1. Pipe:
      a. 4-inch through 12-inch: ASTM D 3034, SDR 35. Bell and spigot joints.
   2. Fittings:
      a. 4-inch through 12-inch: ASTM F 1336.
   3. Joint Gasket: Elastomeric seal, ASTM F 477.

B. Pipes 15" to 48" shall be RCP Class III.

2.2 CURB INLETS, CATCH BASINS, DROP INLETS, JUNCTION STRUCTURES, AREA DRAINS, ETC.

A. General: Size, shape, configuration, depth, etc. of structure and frame, grate, or cover shall be as indicated.

B. Portland Cement Concrete and Reinforcing.

C. Precast Structure: Rate for AASHTO H20 loading in traffic areas.

D. Steps: ASTM C 478 or AASHTO M 199. Manufacture from deformed, ½-inch steel reinforcement rod complying with ASTM A 615 and encased in polypropylene complying with ASTM D4101. Include pattern designed to prevent lateral slippage off step. Acceptable manufacturer is Hanson Concrete Products, (Milpitas, CA) (Tel 408-262-1091).

E. Frames, Grates and Covers: Caltrans Standard Specification Section 75-1.02, 75-1.03 and 75-1.05.

1. Galvanize steel frames, grates and covers.
2. Grates and covers shall be non-rocking.

2.3 Rate for AASHTO H20 loading in traffic areas. MANHOLES

A. General: Size, shape, configuration, depth, etc. of manhole and frame and cover shall conform to Details in Civil Drawings. Precast manholes with cast in place base extending beyond the outside limit of the manhole structure.

B. Portland Cement Concrete and Reinforcing:

1. Poured-in-Place Portion: Section 03301, Site Concrete.
2. Precast Portion: ASTM C 478. Rate for AASHTO H20 loading in traffic areas.
3. Frames and Covers: As indicated and in accordance with Caltrans Standard Specification Section 75-1.02. Frames and covers to be watertight bold down lids.
4. Steps: Manufacture from deformed, ½-inch steel reinforcement rod complying with ASTM A615/A615M and encased in polypropylene complying with ASTM D4101. Include pattern designed to prevent lateral slippage off step.

2.4 JOINT SEALANT FOR PRECAST STRUCTURES AND MANHOLES

A. Mortar: Caltrans Standard Specification Section 51-1.135.

1. Use to seal around pipes at connections to structures and manholes. Also use to seal joints between precast sections of structures and manholes.

B. Gaskets: Preformed flexible rubber or plastic gasket.

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1. Rubber Gaskets: ASTM C443.
2. Plastic Gaskets: Federal Specification SS-S-00210 (GSA-FSS), Type I, Rope Form; or alternate standard which may exist. Acceptable material is "Ram-Nek" as manufactured by the K. T. Snyder Company (Houston TX) or equal.

2.5 POLYMER-CONCRETE TRENCH DRAINS

A. General: Modular system of precast, polymer-concrete channel sections, grates, and appurtenances; designed so grates fit into channel recesses without rocking or rattling. Include number of units required to form total length required.

B. Include the following components:

1. Channel Sections: Interlocking-joint, precast modular units with end caps. Inside width as indicated with deep, rounded bottom, with built in slope or flat invert as indicated and outlets in number, sizes, and locations indicated. Include extension sections necessary for required depth.
2. Frame and Grate: Gray iron, ductile iron or galvanized steel as indicated. Polydrain Model 410 for landscape area, or approved equivalent. Where drain is in traffic areas, rate for AASHTO H20 loading.

C. Locking Mechanism: Manufacturer's standard device for securing grates to channel sections.

D. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Project include, but are not limited to, the following:

1. "Polydrain" by ABT Inc. (Troutman, NC) (Tel 704-528-9806).
2. "ACO Drain" by ACO Polymer Products Inc. (Chardon, OH) (Tel. 800-543-4764).

PART 3 - EXECUTION

3.1 PIPE INSTALLATION

A. General: Install pipe, fittings, and appurtenances utilizing best practices, manufacturer's instructions, and in accordance with Section 6 and 7 of ASTM D 2321 for plastic pipe, Caltrans Standard Specification Section 65-1.07 for reinforced concrete pipe, chapter 11.3.3 of AWWA M41 for cast iron and ductile iron pipe.

B. Pipe Depth and Trench Configuration: Conform to typical trench section(s) indicated on Contract Documents.

C. Excavation, Bedding, Backfill, and Compaction: Section 2310, Utility Trenching and Backfilling.

D. Handling: Carefully handle during loading, hauling, unloading and placing operations to avoid breakage or damage. Use strap type slings for lifting and placing; no chains or hooks will be permitted. Comply with manufacturer's recommendations.

E. Laying: Before lowering pipe into the trench, remove all stakes, debris, loose rock and other hard materials from the bottom of the trench. Lay accurately in conformance with lines and grades indicated. Start laying the pipeline at the low end and proceed upstream. Lay bell and spigot pipe with the bell end facing upstream. Lay pipe on a bed prepared by handwork, dug true to grade. Furnish firm bearing for pipe throughout its entire length with bell holes provided at the ends of each pipe length of sufficient size to permit making up the particular type of joint being used. Adjust pipe to line and grade by scraping away or filling and tamping material under the body of the pipe for the entire pipe length and not by blocking or wedging. After final positioning, hold pipe in place in trench with backfill material placed equally on both sides of the pipe at as many locations as required to hold the pipe section in place.

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F. Curved Alignment: When necessary to conform to the alignment specifically indicated, lay pipe on a curved alignment by means of asymmetrical closure of joints or bending of the pipe barrel. Use shorter lengths of pipe than the standard length if necessary to achieve curvature specified. Do not exceed the recommendations of the pipe manufacture for deflections at the joints or pipe bending.

G. Closure: Close open ends of pipes and appurtenance openings at the end of each day's work or when work is not in progress.

3.2 INSTALLATION OF PIPE ANCHORS

A. Install at location, configuration and details shown on the Contract Documents.

3.3 SPECIAL PIPE COUPLINGS

A. General: Use where required to join piping and no other appropriate method is specified. Do not use instead of specified joining methods.

B. Installation per Manufacturers' recommendations.

3.4 CLEANOUT INSTALLATION

A. General: Install as indicated on Contract Documents.

3.5 INSTALLATION OF CURB INLETS, CATCH BASINS, DROP INLETS, JUNCTION STRUCTURES, AREA DRAINS, ETC. AND MANHOLES

A. Excavation, Bedding, Backfill, and Compaction: Section 2310, Utility Trenching and Backfill.

B. Poured in Place Structures: Install as indicated and Caltrans Standard Specification Section 51.
   1. Shape bottoms to convey flows as indicated.
   2. Precast Structures: Install as indicated.
   3. Seal all joints and pipe entrances and exits.
   4. Place concrete in bottom and shape to convey flows as indicated.

3.6 POLYMER-CONCRETE TRENCH DRAIN INSTALLATION

A. Excavation, Bedding, Backfill, and Compaction: Section 2310, Utility Trenching and Backfill.

B. Install: As indicated and in accordance with the manufacturer's recommendations.

3.7 SLOPE PROTECTION PLACEMENT

A. Rock Slope Protection: Caltrans Standard Specification Section 72-2.03 and as indicated.
   1. Use Method B Placement unless otherwise indicated.

B. Concreted-Rock Slope Protection: Caltrans Standard Specification Section 72-5.03 and 72-5.04.
   2. Use Method B Placement unless otherwise indicated.

3.8 TESTING

A. General: Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.

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   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' notice.
   4. Submit separate reports for each test.
   5. Where authorities having jurisdiction do not have published procedures, perform tests in accordance with latest edition of the Uniform Plumbing Code (UPC) Section 1109.0, Testing.
   6. Leaks and loss in test pressure constitute defects that must be repaired.
   7. Replace leaking piping using new materials and repeat testing until leakage is within allowances specified.

END OF SECTION 33 40 00