CLAREMONT POLICE DEPARTMENT WOMEN'S LOCKER ROOM ADDITION

PROJECT MANUAL

Prepared for
City of Claremont & Claremont Police Department

Prepared by
Dunbar Architecture

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A. PROJECT DIRECTORY

Project Team Directory

PROJECT:	City of Claremont - Police Department Women's Locker Room Addition	**PROJECT ADDRESS:**	570 West Bonita Avenue
DATE:	April 2, 2025		Claremont, CA

COMPANY	ADDRESS	CONTACT	TITLE	WORK	CELL	E-MAIL
Client						
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		Mike Ciszek	Police Chief	(909) 399-5402		mciszek@claremontca.gov
		Chris Veirs	Principal Planner	(909) 399-5486		cveirs@claremontca.gov
		Vince Ramos	Associate Engineer	(909) 399-5395		vramos@claremontca.gov
		Joe Caro	Building Official	(909) 399-5477		jcaro@claremontca.gov
		Melanie Martinez	Admin Assistant	(909) 399-5440		mmartinez@claremontca.gov
Project Manager						
CMPG	1370 Valley Vista Drive Suite 180 Diamond Bar, CA 91765	Christina Gregoire	Director/Project Management	(909) 378-3043	(626) 327-7660	cgregoire@cmpgpm.com
		Jon Lewis	Project Manager	(909) 378-5810	(619) 251-6401	jlewis@cmpgpm.com
		Nina Chang	Project Coordinator	(909) 378-3044		nchang@cmpgpm.com
Architect						
Dunbar Architecture	12314 La Maida Street Valley Village, CA 91607	Jen Dunbar	Architect	(310) 435-2938		jen@dunbararchitecture.com
		Ashley Powell	Architect, CASp	(909) 615-3195		ashley.powell@dunbararchitecture.com
Civil & Structural Engineer						
Wheeler & Gray	1333 South Mayflower Avenue Suite 320 Monrovia, CA 91016	John Kelly	Principal	(626) 432-5850		jkelly@wheelerandgray.com
		Les Schultz	Structural Engineer	(626) 432-5850		lschulz@wheelerandgray.com
Landscape Architect						
Department of Space	480 North Indian Hill Boulevard Suite 2B Claremont, CA 91711	Ben McCoy	Principal	(909) 532-1460		ben@depotofspace.com
Mechanical & Plumbing Engineer						
Kevin A. Smola & Associates	16025 Arrow Highway Suite C Irwindale, CA 91706	Richard Amado		(626) 509-2116		richard@kasai.com
Electrical Engineer						
RBE Consulting Electrical Engineers	3016 East Colorado Boulevard #5249 Pasadena, CA 91107	Daniel Solis		(626) 831-2449		dsolis@rbeconsultants.com

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B. PROJECT NARRATIVE

PROJECT NARRATIVE

CLAREMONT POLICE DEPARTMENT – WOMEN'S LOCKER ROOM ADDITION

The project comprises a new construction addition of approximately 1200 square feet to the Claremont Police Department on the east end of the building. The addition features a new women's locker room facility to provide space for lockers, changing spaces, restrooms, showers, and a quiet room. The new locker room connects to the main building through a newly enclosed entry hallway which will also serve as the new rear entry for the station. The goal of the project is to provide accessible and equivalent facilities for female staff and officers.

The new addition will be an extension to the original 1973 design by local Mid-Century architecture firm Criley & McDowell and will be built using a textured split face reinforced concrete block wall system to closely match the existing building.

As part of the addition, the sitework will include removing the existing pull-in parking spaces and rebuilding the curb to run continuously along the street. The city will be providing a new public accessible parallel parking spot along Bonita Avenue as part of another project. New landscaping will be provided around the new addition.

Because the 1973 Police Department Building has now passed the fifty-year threshold, it can be considered eligible as a potential historic resource given its association with Criley & McDowell.

DESIGN HISTORY

The Claremont police department originally shared the first floor of the fire station with the fire department in the two-story building built for City Hall in 1925[1]. Like many of the small cities throughout Southern California, the city of Claremont grew after the end of World War II, causing the expansion of city hall and its services. In 1973, the police department moved into a new building at 570 West Bonita Avenue designed by local architects, Theodore Criley Jr. and Fred W. McDowell.

The Police Department Building at 570 West Bonita Avenue is a single story, rectangular building situated on a corner lot, with the primary façade of the building running parallel to Bonita Avenue. While the building takes a defensible stance by minimizing the openings (there are only one window facing Bonita Avenue) and providing a free-standing concrete wall to shield the entry, its long low form intentionally tucks into the landscape to reduce the scale of the building. A split-face concrete veneer in a muted earth gray color wraps the building in a uniform pattern.

Low concrete planters formed with sloped ends along with the sloped standing seam metal mechanical screen along the rooftop soften the bunker-like qualities of the building. Wood rafter tails supporting a flat, extended concrete roof, along with the original exterior wood paneling details and timber topped

[1] Nieuber, John. (2018, May 4). "Claremont Heritage: Policing Claremont – part 2." *Claremont Courier*; Retrieved from https://claremont-courier.com/opinion/t27791-claremont-heritage-column-courier-31729

pergola arcade of concrete columns (both of which the wood was removed sometime in the past), speak to the architects' Mid-Century Modern background and style.

THEODORE CRILEY JR. & FRED W. MCDOWELL

The architectural firm of Criley and McDowell are recognized for their numerous projects throughout the City of Claremont , including work on the Claremont Colleges, single family residences, and institutional and civic projects throughout the city.

Theodore Criley Jr. (1905-1984) was the son of California landscape painter Theodore Criley. Criley was educated at MIT and worked briefly for Gordon Kauffman (masterplan for Scripps College) before forming his own practice.

Fred McDowell (1923-2002) studied at both USC and Stanford and apprenticed with Richard Neutra. He began working with Theodore Criley in 1952 and became formal business partners with him in 1957 with their practice in Claremont[2].

[2] Claremont Heritage. "Claremont Modern: An Architectural Tour for the Palm Springs Modern Committee." Retrieved from https://storymaps.arcgis.com/stories/39291a67ed5d407b932d6e04a33276c9

C. PROJECT SPECIFICATIONS

SPECIFICATION TABLE OF CONTENTS:

077100 – ROOF SPECIALTIES

079200 – JOINT SEALANTS

081100 - METAL FRAMES

081400 – WOOD DOORS

083100 – ACCESS DOORS AND FRAMES

084113 – ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

081700 – DOOR HARDWARE

092214 – FURRING AND LATHING

092400 – PORTLAND CEMENT PLASTERING

092900 – GYPSUM BOARD ASSEMBLIES

093000 – TILING

096500– RESILIENT FLOORING

096813 – TILE CARPET

099113 – EXTERIOR PAINTING

099123 – INTERIOR PAINTING

102113 – TOILET COMPARTMENT

102800 – TOILET ROOM ACCESSORIES

104400 – FIRE PROTECTION SPECIALTIES

123661 – SOLID SURFACING COUNTERTOPS

323119 – DECORATIVE METAL FENCES AND GATES

NOTES:

- PLUMBING SPECIFICATIONS ON THE DRAWINGS
- MECHANICAL SPECIFICATIONS ON THE DRAWINGS
- ELECTRICAL SPECIFICATIONS ON THE DRAWINGS
- CIVIL WORK SHALL CONFORM TO THE LATEST EDITION OF THE “STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION” AND ITS STANDARD PLANS AS REFERRED TO ON THESE PLANS, AS THE STANDARD SPECIFICATIONS AND STANDARD PLANS, EXCEPT AS MODIFIED ON THESE PLANS.
- LANDSCAPE AND IRRIGATION INFORMATION ON THE DRAWINGS

013300
SUBMITTALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. A requirement for submittal of shop drawings, product data, samples and other submittals so specified below.

B. In addition to other requirements of the Contract Documents pertaining to submittals, submit shop drawings, product data, samples, and similar submittals required by the Contract Documents for the Historic Architect's review before proceeding with the work affected by these submittals.

C. Submittals made by the Contractor to the Architect that are not required by the Contract Documents may be returned without review.

D. Do not perform any portion of the Work requiring submittal and review of shop drawings, product data and samples, and similar submittals required by the Contract Documents, until the Historic Architect has approved the respective submittal. Such work shall be in compliance with the approved submittals.

E. Related work:

1. See Architectural Specifications for related work.

1.2 SCHEDULING

A. Designate in construction schedule, dates for submittals to be submitted to the Architect. Contractor shall allow a minimum of 5 full working days on the schedule to allow Architect to review and return submittals; additional time may be required for certain submittal items.

1.3 LOG

A. Prepare, and update on a regular basis, a shop drawing log using AIA Form G712, or similar form acceptable to Architect, listing all the required shop drawings by reference to Specification Section number and their submittal date coordinated with the construction schedule.

1.4 DEFINITIONS

A. The terms "shop drawings" and "product data" as used herein also include, but are not limited to, fabrication, erection, layout and setting drawings, manufacturers' standard drawings, descriptive literature, catalogues, brochures, performance and test data, wiring and control diagrams, all other drawings and descriptive data pertaining to materials, equipment, piping, duct and conduit systems, and methods of construction as may be required to show that the materials, equipment, or systems and the positions thereof conform to the Contract Documents.

1. Shop drawings are drawings, diagrams, schedules and other date specially prepared for the Work by the Contractor or a subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

2. Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

3. Product data are illustrations, schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

1.5 SUBMITTALS

A. Prior to the first submittal, submit for review the proposed submittal transmittal form and an impression of the Contractor's approval stamp to be used on submittals.

1.6 SHOP DRAWINGS

A. Identify details by reference to sheet and detail numbers shown on the Drawings.

B. Shop drawings shall show in detail, materials, dimensions, including thickness, methods of assembly, attachments, relation to adjoining work, and all other pertinent data and information.

C. Shop drawings with the notation "VERIFY DIMENSIONS" will not be reviewed.

D. Prepare composite shop drawings and installation layout drawings, where required, to depict proposed solutions for tight or critical field conditions. These composite shop drawings or installation layout drawings shall be coordinated by the Contractor and subcontractors for proper relationship with the work of all other trades based on field conditions.

1.7 PRODUCT DATA

A. Manufacturer standard schematic drawings:

1. Modify drawings to delete information not applicable to Project.

2. Supplement standard information to provide additional information applicable to Project.

B. Manufacturer catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.

1. Clearly mark each copy to identify pertinent materials, products or models.

2. Show dimensions and clearances required.

3. Show performance characteristics and capacities.

4. Show complete wiring diagrams and controls.

1.8 SAMPLES

A. Unless otherwise specified, submit samples of sufficient size and quantity to clearly illustrate characteristics of product or material, and full range of colors and/or texture. Whenever possible provide color and texture samples on product specified.

B. Label each sample to indicate the Project name, Contractor, manufacturer, brand, quarry, job number, color, type, and similar required information. Label shall be solidly attached or adhered to the samples; samples received without labels will be returned without action.

C. Erect field samples and mockups at Project site, unless specified otherwise, in locations acceptable to the Historic Architect. Construct each sample or mockup complete, including work of all trades required in finished work.

1.9 STRUCTURAL CALCULATIONS

A. Where required by the Contract Documents, submit calculations signed and sealed by a California-licensed civil or structural engineer for the material or assembly specified to demonstrate compliance with provisions of the Contract Documents and Code.

1.10 TEMPORARY FACILITIES AND CONTROLS

A. Submittals for temporary facilities and controls, when made to the Historic Architect, are for information only and will not be returned.

1.11 CERTIFICATES AND AFFIDAVITS

A. Statements made by the Contractor, subcontractor, manufacturer, supplier, fabricator, or distributor to certify that certain requirements of the Specifications have been met.

B. Review certificates before submitting to Architect, to ensure that the affidavit is properly worded and signed.

C. Each certificate shall be signed by an official authorized to certify on behalf of the Contractor, subcontractor, manufacturer, supplier, fabricator, or distributor of the and shall contain the name and address of the Contractor, the Project name and location, reference to products, systems, shop drawings, and product data, and the quantity and date or dates of shipment or delivery to which the certificates apply.

1. Copies of laboratory test reports submitted with certificates shall contain the name and address of the testing laboratory and the dates of tests to which the report applies.

D. Certification shall not relieve the Contractor from providing satisfactory material if, after tests are performed on selection samples, the material is found not to meet the specified requirements.

1.12 SUBMITTAL REQUIREMENTS

A. Submittals dates shall be staggered to correspond to the chronological sequence of construction. Early submittals for products or assemblies, such as finishes, unless they affect the critical path, will not be reviewed and will be returned to the Contractor for later re-submittal.

B. Submittals not in compliance with the milestone dates accepted by the Architect in the construction and submittal schedule (out-of-sequence submittals), will not be reviewed and will be returned to the Contractor.

C. Review, approve, and submit shop drawings, product data and samples, and similar submittals required by the Contract Documents, to the Architect with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors, and to allow Architect ample time for review before the date approved submittals will be needed to maintain construction schedule. Contractor shall allow 10 full working days for Historic Architect to review and return submittals; additional time may be required for certain submittal items.

D. Submit a minimum of 2 prints of shop drawings and project data for Contractors' use and sufficient quantity for Architect and their consultants. Bind each set in sequence. Contractor may submit shop drawings and project data electronically utilizing pdfs.

E. Submit 3 samples, unless specified otherwise. By pre-arrangement with the Architect, or where so specified, submit a single sample for review; this sample, when approved, shall be installed in the Work where it can easily be referenced for future comparison with work of the same kind.

F. Submit 3 copies of structural calculations, bound in sequence.

G. Accompany submittals with transmittal letter, in duplicate, containing the following information. Number all submittals, and the accompanying transmittal, sequentially.

1. Date.

2. Project title and number.

3. Contractor name and address.

4. The number of each shop drawing, product data and sample submitted.

5. Notification of deviations from Contract Documents.

6. Other pertinent data.

H. Normally a separate transmittal form shall be used for each specific item or class of material or equipment for which a submittal is required.

1. Transmittal of a submittal for more than one item using a single transmittal form will be permitted only when the items taken together constitute a manufacturer "package" or are so functionally related that expediency indicates a review of the group or package as a whole.

2. Collate multiple-page submittal into sets and staple or bind each set as appropriate prior to transmittal to the Historic Architect.

I. Submittals shall include the following:

1. Date and revision number.

2. Project title and number.

3. The names of: Architect, Contractor, subcontractor, supplier, manufacturer, and separate detailer, when pertinent.

4. Identification of product or material.

5. Relation to adjacent structure or materials.

6. Field dimensions, clearly identified as such.

7. Specification Section number.

8. Applicable standards, such as ASTM or Federal Specification number.

9. Two 2 -inch by 4 -inch blank spaces for the Contractor and Architect stamp.

10. Identification of deviations from Contract Documents. Contractor stamp, initialed or signed, certifying to review of submittal, verification of field measurements and compliance with Contract Documents.

J. By approving and submitting shop drawings, product data, samples and similar submittals the Contractor represents that the Contractor has determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

K. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents.

L. When professional certification of performance criteria of materials, systems or equipment is required by the Contract Documents, the Architect shall be entitled to rely upon the accuracy and completeness of such calculations and certifications furnished by the Contractor.

1.13 RESUBMISSION REQUIREMENTS

A. Revise initial shop drawings, when required, and resubmit as specified for initial submittal. Indicate on drawings changes made, other than those requested by Architect, clearly by clouding or similar acceptable method.

B. Submit new product data and samples as required for initial submittal.

C. Submit revised calculations as required for initial submittal.

D. Identify resubmittal with the original submittal number followed by an alphabetic suffix (i.e. 10A).

1.14 DISTRIBUTION OF SUBMITTALS

A. Distribute copies of shop drawings, product data and other required submittals to Contractor Project site file and project record documents file, and to subcontractors, supplier and fabricator, as applicable.

B. Distribute samples to manufacturer, distributor, supplier or subcontractor, as applicable.

1.15 ARCHITECT DUTIES

A. The Architect will review submittals with reasonable promptness and approve them or take other appropriate action, when applicable, for design concept of Project and information given in Contract Documents.

B. Approval of separate item will not constitute review of an assembly in which item functions.

C. The Architect will stamp and initial or sign submittals indicating review of same, and will return submittals to Contractor for distribution.

D. The term “informational submittals” means that Contractor-furnished data and drawings are for Architect’s review only, and do not require Architect’s approval.

END OF SECTION 01 3300

PART I – GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
   1. Specified tests, inspections, and related actions do not limit Contractor's other quality assurance and quality control procedures that facilitate compliance with the Contract Document requirements.
   2. Requirements for Contractor to provide quality assurance and quality control services required by Architect, Owner, Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature , size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Mock-ups: Full size assemblies that incorporate several materials or elements erected for Architect's review and approval of visual features and workmanship. Mockups represent quality of materials and workmanship required for Work. Mockups are not Samples.

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

1.3 MOCK-UPS

A. General:
   1. Use materials, fabrication and installation methods identical with those indicated for Work. Simulate actual construction conditions as accurately as possible.
   2. Provide mock-ups required by individual Specification sections.

a. Obtain Architect's written approval for each mock-up.
b. Do not start production of materials for final Project site erection until Architect's approval of mock-up has been obtained.
c. Approved mockup will serve as standard of quality and workmanship of Work; maintain mock-up until completion of relevant Work.

3. Upon completion of relevant Work or when directed by Architect, demolish and remove mock-up.
4. Upon approval from Architect, specific mock-ups may remain as part of Work.

B. Visual Mock-up:
1. Provide full scale mock-up for review of Owner and Architect.
2. Unless specified or directed otherwise, erect visual mock-ups at Project site at location acceptable to Architect.
3. Provide mock-up of the following items:
a. Wood Sheathing - Kebony
b. Roof Plaster
c. Wood Rafter Consolidation
d. Paint & Stain
e. Tile
f. Window
g. Split Face CMU
h. Concrete Column Finish

1.4 TESTING LABORATORY SERVICES
A. General Requirements:
1. Provide inspections, tests, and other services specified in individual specification sections and building code.
2. Employment of testing laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents.
3. Where terms "Laboratory," "Inspector," "Inspection Laboratory," or "Testing Laboratory" are used, they mean and refer to officially designated and accredited testing laboratory.
4. Provide testing laboratory with one set of Contract Documents and relevant approved submittals.

B. Selection and Payment: Owner will appoint, employ, and pay for services of an independent testing laboratory to perform specified inspections and testing, unless specified otherwise.

C. Testing Laboratory:
1. Laboratory Qualifications:
a. Maintain staff size and qualifications required by testing standards and specification.
b. Maintain instruments and equipment in accordance with testing standards.
c. Authorized to operate in state where Project is located.
2. Laboratory Responsibilities:
a. Cooperate with Architect and Contractor; provide qualified personnel after due notice.
b. Perform inspections, sampling, and testing in accordance with specified standards.
c. Ascertain compliance of materials and mixes with requirements of Contract Documents.
d. Provide inspections, tests, and other services specified in individual specifications sections.
e. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products with Contract Documents.
3. Laboratory and inspection personnel are not authorized to:

a. Release, revoke, alter, relax, or enlarge any requirements of Contract Documents.
b. Perform any duties of Contractor.
c. Approve or accept any portion of Work.
d. Stop the Work.

4. Contractor Responsibilities:
    1. Cooperate with laboratory personnel, provide access to Work and manufacturer's operations.
    2. Deliver samples or test mock-ups to testing laboratory prior to being proratedated into Work.
    3. Furnish copies of product tests or mill test reports as specified or required.
    4. Furnish incidental labor and facilities:
        a. To obtain access to Work to be tested.
        b. To obtain and handle samples at Project site or at source of product to be tested.
        c. To facilitate inspections and tests.
        d. For storage and curing of samples.
    5. Notify Architect and laboratory 48 hours prior to expected time for operations requiring inspection and testing services.
    6. When inspections or tests cannot be performed after proper notification and at no fault of laboratory, reimbursement costs for laboratory expenses incurred will be charged to the Contractor by deducting charges from Contract Sum.

1.5 SUBMITTALS

1. Provide submittals in accordance with Section 013300.
2. Laboratory Reports:
    a. Include with each report:
        1) Date issued.
        2) Project title and number
        3) Testing laboratory name, address, and telephone number.
        4) Record of temperature and weather conditions.
        5) Names of individuals making tests and inspections. Name and signature of person submitting report.
        6) Dates, times, and locations of sampling, testing, and inspections.
        7) Identification of specification section and products.
        8) Location in Project.
        9) Type of inspection or test.
        10) Reference standards used for tests.
        11) Name of material suppliers.
        12) Results of tests and interpretation of test results.
        13) Professional opinion of whether tested and inspected Work complies with Contract Documents.
        14) Certified statements signed and sealed by testing laboratory attesting to accuracy of testing results.
        15) Number pages.
    b. Submit test reports within 2 weeks of test date.
    c. After each inspection and test, promptly submit a copy of written reports to Owner, Architect, Code Official, Contractor.
    d. When requested by Architect, provide interpretation of test results and suggested remedies.

1.6 FAILURES and RETESTING

A. When initial inspections and tests indicate Work does not comply with Contract Documents, subsequent testing will be performed by same Testing Agency and will be done at Contractor's expense and deducted from Contract Sum.

B. Removal and replacement of Work necessitated by such non-compliance of Contract Documents shall be at Contractor's expense.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 REPAIR AND PROTECTION

A. Protect construction exposed by testing service activities.

B. Upon completion of inspection, testing, sample-taking, and similar services, repair damaged construction. Comply with requirements of Section 017329 – Cutting and Patching.

SECTION 024119
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Section Includes:
1. Removal of designated building equipment, materials and fixtures.
2. Removal of existing construction to accommodate new construction.
3. Disconnecting and capping of identified utilities.
4. Protection of existing materials to remain.

B. Related Sections:
1. Section 011500: General Requirements for Work on Historic Buildings
2. Section 013591: Historic Treatment Procedures
3. Section 024291: Selective Removal and Storage of Historic Building Materials.

1.2 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.3 PRE-DEMOLITION CONFERENCE

A. Pre-demolition Conference: Conduct conference at Project site.
1. Inspect and discuss condition of construction to be selectively demolished.
2. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
4. Coordinate openings into building for access into building, specifically basement.
5. Identify items to be protected and preserved before proceeding with work
6. Conduct walking inspection to identify materials and equipment to be salvaged for re-installation and Owner use.
7. During walking inspection, photograph or otherwise determine and record existing physical conditions of boundary areas. Surfaces, equipment, or other items damaged during demolition work are to be restored to original condition as recorded during walking inspection.
8. Agree upon location where items salvaged for Owner are to be delivered and stored.

1.4 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:
1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
2. Path of travel for removing debris.
3. Arranged coordination for shut-off, capping, and continuation of utility services.

B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for dust control and for noise control. Indicate proposed locations and construction of barriers.

1. Protection Measures to be in accordance with Section 013591 – Historic Treatment Procedures.

C. Submit following Informational Submittals:
1. Certifications specified in Quality Assurance article.
2. Qualification Data: Submit demolition contractor's qualifications.

1.5 QUALITY ASSURANCE

A. Contractor Qualifications: Subcontractors and personnel working in areas of Historic Fabric shall demonstrate experience by having worked on at least 5 other historic buildings.

B. Regulatory Requirements:
1. Comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state and federal authorities having jurisdiction.
2. Obtain and pay for necessary permits and notices; post where required.
3. Comply with safety requirements of local fire department.
4. Comply with governing EPA notification regulations before beginning selective demolition.
5. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

D. Notify affected utility companies before starting work and comply with their requirements.

E. Do not close or obstruct egress width of fire exits or access.

F. Do not disable or disrupt building fire or life safety systems without 72 hours prior written notice to Owner.

1.6 PROJECT CONDITIONS

A. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

B. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

C. Existing Conditions: Owner assumes no responsibility for actual conditions of areas to be demolished.

D. Hazardous Materials:
1. Inform Architect and Owner’s Representative immediately upon discovery of asbestos products, radioactive materials, radon gas, toxic wastes, or other similar hazardous materials.
2. Strictly follow procedures and regulations applicable to hazardous materials.
3. Do not remove hazardous materials without Owner authorization.
4. Give special consideration to handling of material that may contain asbestos. Neither asbestos detection or removal is part of this Contract, and direction relating to that type of work will be given by the Owner.
5. Architect will have no responsibility for detection, evaluation, or removal of asbestos materials, or for construction contract administration of removal process.

E. Historic Areas: Demolition and hauling equipment and other materials shall be of sizes that clear surfaces within historic spaces, areas, rooms, and openings, including temporary protection, by 12 inches or more.

F. Storage or sale of removed items or materials on-site is not permitted.

G. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

H. Explosives: Not permitted.

I. Traffic and Passageways:
   1. Maintain accessibility for firefighting apparatus.
   2. Conduct demolition operations and debris removal to avoid interference with use of roads, streets, walks, and adjacent occupied facilities.
   3. Obtain written permission from authorities having jurisdiction prior to closing or obstructing streets, walks, or other adjacent occupied facilities.
   4. Provide alternate routes when closing or obstructing traffic ways when required by governing authorities.
   5. Ensure safe passage of persons around area of demolition. Provide and maintain temporary covered passageways; comply with requirements of governing authorities.

J. Protection:
   1. Perform Work in manner to eliminate hazards to persons or property and avoid interference with adjacent areas, utilities and structures.
   2. Provide and maintain temporary barricades, fences, warning signs, guardrails, warning lights, weatherproof and dust partitions, and other similar provisions as necessary or required by applicable regulatory authorities for protection of building occupants and workers.
   3. Provide and maintain fire extinguishers; comply with requirements of governing authorities.
   4. Maintain existing utilities which are to remain in service and protect from damage during demolition operations.
   5. Do not interrupt existing utilities serving occupied facilities, except when authorized by Owner's Representative in writing. Provide temporary services during interruptions to existing utilities.
   6. Coordinate in advance with Owner's Representative mechanical, electrical, and plumbing shutdowns.
   7. Protect existing work indicated to remain from damage.
   8. Protect existing floors with suitable coverings when necessary.
   9. Construct temporary dustproof partitions and seal return air plenums where necessary to areas where noisy or dirt and dust operations are being performed. Provide temporary weather protection for areas where existing exterior elements were removed to ensure no water leakage or damage occurs to structure or interior areas of existing building.

PART 2 - PRODUCTS

NOT USED

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect and Architectural Historian.

D. Verify demolition areas are unoccupied.

E. Document existing conditions in accordance with Section 01500, paragraph 1.8.

3.2 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage, or injury.

D. Cover and protect furniture, equipment, and fixtures scheduled to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.

E. Utilities:
1. Mark and identify location of utilities to be disconnected.
2. Notify affected utility company in advance of date and time when service needs to be disconnected.
3. Disconnect and cap utility services; Comply with requirements of governing authorities.
4. Do not commence demolition operations until associated disconnections have been completed.

F. During removal of existing roofing, provide proper protection from falling objects over entrance which are to be kept open during normal working hours.

3.3 SELECTIVE DEMOLITION

A. General:
1. Conduct demolition to minimize interference with adjacent occupied building areas. Cease demolition operations immediately if adjacent structures appear to be in danger. Conduct safety operations as necessary. Do not resume demolition operations until directed.
2. Conduct operations with minimum interference to public or private accesses. Maintain egress and access at all times.
3. Sprinkle debris with water to minimize dust. Provide hoses and water connections as necessary.
4. Do not cause flooding or contaminated runoff.

B. Perform demolition in accordance with governing authorities.

C. Remove and immediately dispose of contaminated or vermin infested materials when encountered.

D. Do not burn or bury materials or debris on site. Leave structures and site in clean condition.

E. Demolish and remove existing modern construction covering original historic materials and finishes only to the extent required by the Work and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
   2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
   3. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
   4. Dispose of demolished items and materials promptly.

F. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition in
   1. Protect historic materials in accordance with Section 013592 – Historic Treatment Procedures.

G. Removed and Salvaged items in accordance with Section 024291 – Selective Removal and Storage of Historic Building Materials.

3.4 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.5 ADJUSTING

A. Repair demolition performed in excess of that required.

B. Return structures and surfaces to remain to conditions existing prior to commencement of selective demolition Work.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 03 2000

CONCRETE REINFORCING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete steel reinforcement.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 01 4523: Testing and Inspection.

3. Section 03 1000: Concrete Forming.

4. Section 03 3000: Cast-In-Place Concrete.

5. Section 04 2200: Concrete Unit Masonry.

1.02 REGULATORY REQUIREMENTS

A. Fabrication and placement of reinforcing shall be in accordance with requirements of CBC, Chapter 19.

1.03 REFERENCES

A. ASTM International:

1. ASTM A184 - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement.

2. ASTM A615 - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

3. ASTM A706 - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement.

4. ASTM A1064 - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete.

B. American Concrete Institute (ACI) Publication:

1. ACI SP-66 – ACI Detailing Manual.

2. ACI 318 – Building Code Requirements for Structural Concrete, as modified by CBC.

3. ACI 117 – Specifications for Tolerance for Concrete Construction and Materials.

C. American Welding Society (AWS):

1. AWS D1.4 – Structural Welding Code – Reinforcing Steel.

D. Concrete Reinforcing Steel Institute (CRSI):

1. Manual of Standard Practice.

1.04 SUBMITTALS

A. Shop Drawings: Submit steel reinforcement Shop Drawings. Include assembly diagrams, schedule of reinforcement, stirrup spacing, bending charts and slab and framing plans. Indicate lengths and location of splices, laps of bars, size and lengths of reinforcing steel. Indicate steel type and grade of reinforcement. Indicate epoxy or non-epoxy reinforcement on general notes.

B. Closeout Submittals: Record exact locations of reinforcing that vary from Contract Documents.

C. Manufacturer's Mill Certificate: Submit, certifying that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement:

1. Concrete Reinforcing Steel Institute (CRSI) Manual of Standard Practice.

2. American Welding Society (AWS).

3. American Concrete Institute (ACI).

4. CBC, Chapter 19, Concrete.

B. Source Quality Control: Refer to Division 01 Sections for general requirements and to the following paragraphs for specific procedures. Testing laboratory retained by the OWNER shall select test Samples of bars, ties, and stirrups from the material at the Project Site or from the place of distribution, with each Sample consisting of not less than two 18 inch long pieces, and perform the following tests according to ASTM A615, or ASTM A706, as applicable:

1. Identified Bars: If Samples are obtained from bundles as delivered from the mill, identified as to heat number, accompanied by mill analyses and mill test reports, and properly tagged with the identification certificate so as to be readily identified, perform one tensile and one bend test for each 10 tons or fraction thereof of each size of bars. Submit mill reports when Samples are selected.

2. Unidentified Bars: When positive identification of reinforcing bars cannot be performed and when random Samples are obtained; perform tests for each 2.5 tons or fraction thereof, one tensile and one bend test from each size of bars.

C. Certification of Welders: Shop and Project site welding shall be performed by welding operators certified by AWS.

1.06 DELIVERY, STORAGE AND HANDLING

A. Avoid exposure to dirt, moisture or conditions harmful to reinforcing.

B. Reinforcing steel bars, wire, and wire fabric shall be stored on the Project site to permit easy access for examination and identification of each shipment. Material of each shipment shall be separated for size and shape.

PART 2 - PRODUCTS

2.01 GENERAL

A. Provide reinforcing of sizes, gages and lengths indicated, bent to indicated shapes.

2.02 MATERIALS

A. Steel Reinforcing Bars:

1. ASTM A615, deformed grade 60 or 75 billet steel, as indicated on the drawings.

2. Weldable reinforcing bars shall conform to ASTM A706.

B. Bars or Rod Mats: ASTM A184.

C. Welded Wire Fabric for Reinforcement: ASTM A1064.

D. Tie Wire: ASTM A1064, fully annealed, copper-bearing steel wire, 16 gage minimum.

E. Chairs, Spacers, Supports, and Other Accessories: Standard manufacture conforming to ACI 315 fabricated from steel wire of required types and sizes. For reinforcement supported from grade, provide properly sized dense precast blocks of concrete.

2.03 FABRICATION OF REINFORCING BARS

A. Comply with CRSI Manual of Standard Practice for Reinforced Concrete Construction for fabrication of reinforcing steel.

B. Bending and Forming: Fabricate bars of the indicated sizes and bend and form to required shapes and lengths by methods not injurious to materials. Do not heat reinforcement for bending. Bend bars No. 6 size and larger in the shop only. Bars with unscheduled kinks or bends are not permitted. Provide only tested and permitted bar materials.

C. Welding: Provide only ASTM A706 steel where welding is indicated. Perform welding by the direct electric arc process in accordance with AWS D1.4 and specified low-hydrogen electrodes. Preheat 6 inches each side of joint. Protect joints from drafts during the cooling process; accelerated cooling is not permitted. Do not tack weld bars. Clean metal surfaces to be welded of loose scale and foreign material. Clean welds each time electrode is changed and chip burned edges before placing welds. When wire brushed, the completed welds must exhibit uniform section, smooth welded metal, feather edges without undercuts or overlays, freedom from porosity and clinkers, and good fusion and penetration into the base metal. Cut out welds or parts of welds deemed defective, using chisel, and replace with proper welding. Prequalification of welds shall be in accordance with CBC requirements.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Bars shall be bent cold. Bars partially embedded in concrete shall not be field bent except as indicated on reviewed Shop Drawings.

B. Before installation and just prior to placing concrete, clean reinforcing of loose scale, rust, oil, dirt and any coating that could reduce bond.

C. Accurately position, install, and secure reinforcing to prevent displacement during the placement of concrete.

D. Provide metal chairs to hold reinforcement the required distance above form bottoms. In beams and slab construction, provide chairs under top slab reinforcement as well as under bottom reinforcement. Space chairs so that

reinforcement will not be displaced during installation. Provide metal spacers to secure proper spacing. Stirrups shall be accurately and securely wired to bars at both top and bottom. At slabs, footings, and beams in contact with earth, provide concrete blocks to support reinforcement at required distance above grade.

E. Install and secure reinforcement to maintain required clearance between parallel bars and between bars and forms. Lapped splices shall be installed wherever possible in a manner to provide required clearance between sets of bars. Stagger lapped splices. Dowels and bars extending through construction joints shall be secured in position against displacement before concrete is installed and subsequently cleaned of concrete encrustations while they are still soft.

F. Do not install reinforcing in supported slabs and beams until walls and columns have been installed to underside of slabs and beams or until construction joints have been thoroughly cleaned. Reinforcing shall be inspected before placement of concrete and cleaned as required.

G. Use deformed bars unless otherwise indicated, except for spiral reinforcement.

3.02 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.03 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 03 3000

CAST-IN-PLACE CONCRETE

EDIT NOTE: INCLUDE IN PROJECT MANUAL SECTION 07 2600, VAPOR BARRIERS.

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cast-in-place normal weight and lightweight concrete, placement and finishing.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 03 1000: Concrete Forming and Accessories.

3. Section 03 2000: Concrete Reinforcing.

4. Section 07 2600: Vapor Barriers.

5. Section 32 1313: Site Concrete Work.

1.02 REFERENCES

A. American Concrete Institute (ACI) Publication:

1. ACI 117 – Specifications for Tolerances for Concrete Construction and Materials.

2. ACI 301 – Specifications for Structural Concrete.

3. ACI 302.1R – Guide for Concrete Floor and Slab Construction.

4. ACI 305R - Specification for Hot Weather Concreting.

5. ACI 306.1 – Standard Specification for Cold Weather Concreting.

6. ACI 308R – Guide to External Curing of Concrete.

7. ACI 318 - Building Code Requirements for Structural Concrete, as modified by CBC Sections 1903 and 1905.

B. American Society for Testing and Materials (ASTM) Standards:

1. ASTM C31 – Standard Specification for Making and Curing Concrete Test Specimens in the Field.

2. ASTM C33 - Standard Specification for Concrete Aggregates.

3. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.

4. ASTM C42 - Standard Test Method for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete.

5. ASTM C88 - Standard Test Method for Soundness of Aggregates by use of Sodium Sulphate or Magnesium Sulphate.

6. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

7. ASTM C143 - Standard Test Method for Slump of Hydraulic Cement Concrete.

8. ASTM C150 - Standard Specification for Portland Cement.

9. ASTM C156 – Standard Test Method for Water Loss (from a Mortar Specimen) Through Liquid Membrane-Forming Curing Compounds for Concrete.

10. ASTM C171 - Standard Specification for Sheet Materials for Curing Concrete.

11. ASTM C172 – Standard Practice for Sampling Freshly Mixed Concrete.

12. ASTM C173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.

13. ASTM C260 – Standard Specification for Air-Entraining Admixtures for Concrete.

14. ASTM C289 - Standard Test Method for Potential Alkali-Silica Reactivity of Aggregates (Chemical Method).

15. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete.

16. ASTM C330 - Standard Specification for Lightweight Aggregates for Structural Concrete.

17. ASTM C494 - Standard Specification for Chemical Admixtures for Concrete.

18. ASTM C567 - Standard Test Method for Determining Density of Structural Lightweight Concrete.

19. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete.

20. ASTM C845 - Standard Specification for Expansive Hydraulic Cement

21. ASTM C989 - Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete and Mortars.

22. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

23. ASTM C1064 - Standard Test Method for Temperature of Freshly Mixed Hydraulic-Cement Concrete.

24. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures.

25. ASTM C1315 – Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete.

26. ASTM D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.

27. ASTM C1567 - Standard Test Method for Determining the Potential Alkali-Silica Reactivity of Combinations of Cementitious Materials and Aggregate (Accelerated Mortar-Bar Method).

28. ASTM D1751 - Standard Test Method for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Non-extruding and Resilient Bituminous Types).

29. ASTM D7234 – Standard Test Method for Pull-Off Adhesion Strength of Coatings on Concrete Using Portable Pull-Off Adhesion Testers.

30. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

31. ASTM E1155 - Standard Test Method for Determining F_F Floor Flatness and F_L Floor Levelness Numbers.

32. ASTM E1643 - Standard Practice for Selection, Design, Installation, and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill under Concrete Slabs.

33. ASTM E1745 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.

34. ASTM F710 – Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.

35. ASTM F1869 – Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

36. ASTM F2170 – Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using In Situ Probes.

37. ASTM F3010 – Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use under Resilient Floor Coverings.

1.03 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating locations of cast-in-place concrete Work and accessory items such as vapor barriers. Include details and locations of reinforcing, embedded items, and interfacing with other Work. Indicate dimensions and compressive strength.

B. Mix Design Data: Submit concrete mix designs as specified herein and in Article 2.02.

1. Submit name, address and telephone number of the concrete production facility which the contractor intends to engage to design the concrete mixes. Submit name and qualifications of the proposed concrete technologist.

2. Mix Design: Submit a concrete mix design for each strength and type of concrete indicated in the drawings or specified. Include water/cement ratio, source, size and amount of coarse aggregate and admixtures. Predict minimum compressive strength, maximum slump and air content percentage. Clearly indicate locations where each mix design will be used.

a. Water/cement ration for concrete slabs on grade shall be 0.50 maximum.

3. Test Reports: Submit copies of test reports showing that the proposed mixes produce concrete with the strengths and properties specified. Include tests for cement, aggregates and admixtures. Provide gradation analysis.

C. Material Samples: Submit Samples illustrating concrete finishes and hardeners, minimum 12-inch by 12-inch.

D. Certificates: Submit certification that each of the following conforms to the standards indicated:

1. Portland cement: ASTM C150.

2. Normal weight concrete aggregates: ASTM C33.

3. Lightweight concrete aggregates: ASTM C330.

4. Aggregates: Submit evidence that the aggregate is not reactive in the presence of cement alkalis. In the absence of evidence, aggregate shall be tested by one of the methods in ASTM C33 Appendix XI, Methods for Evaluating Potential for Deleterious Expansion Due to Alkali Reactivity of an Aggregate. Aggregates

deemed to be deleterious or potentially deleterious may be used with the addition of a material that has been shown to prevent harmful expansion in accordance with Appendix XI of ASTM C33, when approved by the building official, in accordance with ACI 318 Section 26.4.1.2.1(a)(1) as modified by CBC Section 1903.5.

5. Curing materials: ASTM C171.

E. Admixtures: Submit product data for proposed concrete admixtures.

1.04 QUALITY ASSURANCE

A. Continuous inspection shall be provided at the batch plant and for transit-mixed concrete to run check sieve analysis of aggregate, check moisture content of fine aggregate, check design of mix, check cement being used with test reports, check loading of mixer trucks, and certify to quantities of materials placed in each mixer truck.

B. Inspection shall be performed by a representative of a testing laboratory selected by the OWNER. OWNER will pay for inspection costs. Notify the laboratory 24 hours in advance of time concrete is to be mixed. Notify the laboratory of postponement or cancellation of mixing within at least 24 hours of scheduling time.

C. CONTRACTOR shall assist the testing laboratory in obtaining and handling samples at the project site and at the source of materials.

D. Continuous batch plant inspection requirement may be waived in accordance with CBC Section 1705.3.3.1. Waiver shall be in writing, including City approval. When batch plant inspection is waived by the City, the following requirements shall be met:

1. Approved inspector of the testing laboratory shall check the first batching at the start of work and furnish mix proportions to the licensed weightmaster.

2. Licensed weightmaster shall positively identify materials as to quantity and certify to each load by a ticket.

3. Tickets shall be transmitted to the Inspector by a truck driver with load identified thereon. The Inspector will not accept the load without a load ticket identifying the mix and will keep a daily record of placements, identifying each truck, its load and time of receipt and approximate location of deposit in the structure and will transmit a copy of the daily record to the City.

4. At the end of the project, the weightmaster shall furnish an affidavit to City certifying that all concrete furnished conforms in every particular to proportions established by mix designs.

E. Special Inspections and Tests shall be in accordance with CBC Chapter 17, Reinforcement and Anchor testing per CBC Section 1903 and Specification Section 01 4523.

1.05 DELIVERY, STORAGE AND HANDLING

A. Store cement and aggregate materials so as to prevent their deterioration or intrusion by foreign matter. Deteriorated or contaminated materials shall not be furnished.

B. Packaged materials shall bear the manufacturers and brand name label and shall be stored in their original unbroken package in a weather tight place until ready for use in the work.

1.06 PROJECT CONDITIONS

A. Cold Weather Requirements: Batching, mixing, delivering and placing of concrete in cold weather shall comply with the applicable requirements of ACI 306.1.

B. Hot Weather Requirements: Batching, mixing, delivering and placing of concrete in hot weather shall comply with the applicable requirements of ACI 305R.

C. Concrete temperature of freshly mixed concrete shall be determined per ASTM C1064.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Cement: ASTM C150. Portland Cement.

B. Aggregates: Conform to the following standards:

1. Normal weight concrete: ASTM C33.

2. Lightweight concrete: ASTM C330, with fine aggregates per ASTM C33.

3. Aggregate shall be tested for Potential Alkali Reactivity of Cement-Aggregate Combinations per ASTM C289.

4. Nominal maximum size of coarse aggregate shall be no larger than:

a. 1/5 the narrowest dimension between sides of forms, nor

b. 1/3 the depth of slabs, nor

c. 3/4 the clear spacing between individual reinforcing bars or wires, bundles of bars, individual tendons, or ducts.

d. CONTRACTOR may request the ARCHITECT and City waiver of the above limitations reported per ACI 318, provided that the workability and methods of consolidation are such that the concrete can be placed without honeycombs or voids.

C. Water: Water for concrete mixes, curing and cleaning shall be potable and free from deleterious matter.

D. Admixtures: Shall be shown capable of maintaining essentially the same composition and performance throughout the work as the product used in establishing concrete proportions in accordance with ACI 318, Section 3.6.

1. Admixtures containing chlorides or sulfides are not permitted.

2. Air-entraining admixtures shall comply with ASTM C260. Air-entrained admixtures shall not be used for floor slabs to receive steel trowel finish.

3. Admixtures for water reduction and setting time modification shall conform to ASTM C494.

4. Admixtures containing ASTM C845 expansive cements shall be compatible with the cement and produce no deleterious effects.

5. Silica fumes used as an admixture shall conform to ASTM C1240.

E. Reinforcement Fibers: Chop strands of alkali-resistant polypropylene or nylon fibers added to the concrete mix for protection against shrinkage cracks.

F. Expansion Joint Fillers: Preformed strips, non-extruding and resilient bituminous type, of thickness indicated, conforming to ASTM D1751.

G. Curing:

1. Curing Paper: Shall conform to ASTM C171 and consist of two sheets of kraft paper cemented together with a bituminous material in which are embedded cords or strands of fiber running in both directions. The paper shall be light in color, shall be free of visible defects, with uniform appearance.

2. Elevated slabs and slabs on grade may be cured at CONTRACTOR's option with curing and proactive water vapor emission and alkalinity control system. Products shall be approved by OWNER's Office of Environmental Health and Safety.

a. VaporSeal 309, by Floor Seal Technology, Inc., or equal.

1)	ASTM C156:	0.39 kg/m².
2)	ASTM C309:	Exceeds requirements.
3)	ASTM C1315:	Exceeds requirements.
4)	ACI 308R-01	Compliant.

b. Remedial Treatment: Water vapor emission and alkalinity control treatment, MES 100 by Floor Seal Technology, Inc. or equal.

1)	ASTM E96:	<0.1 Perms.
2)	ASTM D1308:	14pH Resistant.
3)	ASTM D7234:	500+psi 100% concrete failure.
4)	ASTM F2170:	100%RH resistant.
5)	VOC Content:	<100 g/L, meets SCAQMD Rule #1113.
6)	ASTM F3010:	Meets Requirements.

c. Self-leveling Compounds: Ardex Engineered Cements, K15, or V1200, Schonox ZM Rapid, US Self Leveler Armstrong, S-194, or equal.

H. Floor Hardener: Water soluble, inorganic, silicate-based curing, hardening, sealing and dustproofing compound. Aquaseal W20 by Monopole Inc., Kure-N-Harden by BASF, Chem Hard by L&M, Liqui-Hard by W. R. Meadows, or equal.

I. Underlayment: Two component latex underlayment for filling low spots in concrete for both interior and exterior applications, from featheredge to a maximum of 3/8 inch in thickness. Underlayment shall be non-shrink and suitable for repairing exposed concrete surfaces and for underlayment of carpet, resilient, tile and quarry floor coverings. La-O-Tex by TexRite, Underlay C, RS by Mer-Krete Systems, Underlayment 962 by C-Cure, or equal.

J. Vapor Barrier: Refer to Section 07 2600, Vapor Barriers.

K. Stair Treads and Nosings: Two part stair tread and nosing with ribbed abrasive bars. Fabricated from 6063-T5 or 6063-T6 extruded aluminum, mill finish. Anti-slip abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in an epoxy-resin binder. Color shall extend uniformly throughout filler.

1. American Safety Tread: TP-311R.

2. Balco Inc.: DST-330.

3. Nystrom: STTB-P3.375E.

4. Wooster Products Inc.: WP-RN3SG.

5. Equal.

L. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of

developing a minimum compressive strength of 7,000 psi at 7 days; of consistency suitable for application and a 30 minute working time.

2.02 CONCRETE MIX

A. Mix shall be signed and sealed by a Civil or Structural Engineer currently registered in the State of California.

B. Strength of Concrete: Strengths and types of concretes shall be as indicated in the Drawings. Unless otherwise indicated or specified, concrete shall be provided with minimum 28-day strength of 3000 psi (f'c).

C. Concrete mix shall meet the durability requirements of ACI 318, Chapter 4.

D. Concrete proportioning shall be determined on the basis of field experience and/or trial mixtures shall in accordance with ACI 318, Section 5.3. Proportions of materials shall provide workability and consistency to permit concrete to be placed readily into forms and around reinforcement under conditions of placement to be employed, without segregation or excessive bleeding.

E. Ready-Mixed Concrete: Mix and deliver in accordance with requirements of ASTM C94.

PART 3 - EXECUTION

3.01 GENERAL

A. Surfaces to receive concrete shall be free of debris, standing water, and any other deleterious substances before start of concrete placing.

B. Time of Placing: Do not place concrete until reinforcement, conduits, outlet boxes, anchors, hangers, sleeves, bolts, and other embedded materials are securely fastened in place. Contact the Inspector at least 24 hours before placing concrete; do not place concrete until inspected by the Project Inspector.

C. Pouring Record: A record shall be kept on the Project site of time and date of placing concrete in each portion of structure. Such record shall be maintained on the Project site until Substantial Completion and shall be available for examination by the ARCHITECT and City.

3.02 TOLERANCES

A. Concrete construction tolerances shall be as specified in ACI 117 and as modified herein.

B. Floor Flatness (F_F) and Floor Levelness (F_L) shall be as indicated below:

	Specified Overall Value		Minimum Local Value	
	F_F	F_L	F_F	F_L
Slabs on ground: mechanical and electrical rooms, parking structures and mortar bed set tile and quarry flooring.	20	15	15	10
Slab on ground: carpet.	25	20	17	15
Slab on ground: thinset tile and resilient flooring.	35	25	24	17
Suspended slabs: mechanical and electrical rooms, parking structures and mortar bed set tile and quarry flooring.	20	15	N/A	N/A
Suspended slabs: carpet.	25	20	N/A	N/A
Suspended slabs: thinset tile and resilient flooring.	35	20	N/A	N/A

C. Refer to ACI 302.1R, Tables 8.1 and 8.2 Slab on Ground and Suspended Flatness/Levelness Construction Guide, for recommended concrete placing and finishing methods.

D. Floor Flatness and Floor Levelness shall be tested in accordance to ASTM E1155. Floor measurements shall be made within 48 hours after slab installation, and shall precede removal of shores and forms.

3.03 PREPARATION

A. For installation of vapor barrier refer to Section 07 2600, Vapor Barriers.

B. Reglets and Rebates:

1. Form reglets and rebates in concrete to receive flashing, frames and other equipment as detailed and required. Coordinate dimensions and locations required with other related Work.

2. If concrete slabs on grade adjoin a wall or other perpendicular concrete surface, form a reglet in wall to receive and carry horizontal concrete Work. Reglet shall be full thickness of the slab and shall be 3/4 inch wide, unless otherwise indicated. Requirement does not apply to exterior walks, unless specifically indicated.

C. Screeds: Install screeds accurately and maintain at required grade or slab elevations after steel reinforcement has been installed, but before starting to place concrete. Install screeds adjacent to walls and in parallel rows not to exceed 8 feet on centers.

3.04 INSTALLATION

A. Conveying and Placing:

1. Concrete shall be placed only under direct observation of the Project Inspector. Do not place concrete outside of regular working hours, unless the Inspector has been notified at least 48 hours in advance.

2. Concrete shall be conveyed from mixer to location of final placement by methods that will prevent separation or loss of materials.

3. Concrete shall be placed as nearly as practicable to its final position to avoid segregation due to re-handling or flowing. No concrete that has partially hydrated or has been contaminated by foreign materials shall be placed, nor shall re-tempered concrete or concrete which has been remixed after initial set be placed.

4. In placing concrete in columns, walls or thin sections, provide openings in forms, elephant trunks, tremies or other recognized devices, to prevent segregation and accumulation of partially hydrated concrete on forms or metal reinforcement above level of concrete being placed. Such devices shall be installed so that concrete will be dropped vertically. Unconfined vertical drop of concrete from end of such devices to final placement surface shall not exceed 6 feet.

5. Concrete shall be placed as a continuous operation until placing of panel or section is completed. Top surfaces of vertically formed lifts shall be level.

6. Concrete shall be thoroughly consolidated by suitable means during placement and shall be thoroughly worked around reinforcement and embedded fixtures and into corners of forms.

7. Where conditions make consolidation difficult or where reinforcement is congested, batches of mortar containing same proportions of cement, sand, and water as provided in the concrete, shall first be deposited in the forms to a depth of at least one inch.

B. Cold Weather:

1. Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. All ground with which concrete is to come in contact shall be free from frost. No frozen materials or materials containing ice shall be used.

2. The temperature of concrete at the time of placement shall not be below the minimum temperatures given in Table 3.1 of ACI 306.1.

3. Concrete shall be maintained at a temperature of at least 50° F. for not less than 72 hours after placing or until it has thoroughly hardened. Cover concrete and provide sufficient heat as required. When necessary, aggregates shall be heated before mixing. Special precautions shall be taken for protection of transit-mixed concrete.

C. Hot Weather:

1. Concrete to be placed during hot weather shall comply with the requirements of ACI 318, Section 5.13.

2. Maintain concrete temperatures indicated in Table 2.1.5 of ACI 305R to prevent the evaporation rate from exceeding 0.2 pound of water per square feet of exposed concrete per hour.

3. Cool concrete using methods indicated in ACI 305R Appendix B.

4. Place and cure concrete as specified in ACI 305R Chapter 4.

D. Compaction and Screeding:

1. Tamp freshly placed concrete with a heavy tamper until at least 3/8 inch of mortar is brought to surface. Concrete shall then be tamped with a light tamper and screeded with a heavy straightedge until depressions and irregularities are eliminated, and surface is true to finish grades or elevations. Remove excess water and debris.

2. Where slabs are to receive separate cement finish or mortar setting bed, continued tamping to raise mortar to surface is not performed. Laitance shall be removed by brushing with a stiff brush or by light sandblasting to expose clean top surface of coarse aggregate.

E. Floating and Troweling:

1. When concrete has hydrated sufficiently, it shall be floated to a compact and smooth surface. After floating, wait until concrete has reached proper consistency before troweling. Top surfaces shall receive at least 2 troweling operations with steel hand trowel. Prior to and during final troweling, apply a fine mist of water frequently with an atomizing type fog sprayer. Omit troweling for slabs to receive a separate cement finish.

2. For interior finish slabs, final troweling shall provide a hard, impervious, and non-slip surfaces, free from defects and blemishes. Finished surface shall be within tolerances indicated in Article 3.02. Avoid burnishing. Do not add cement or sand to absorb excess moisture.

a. Floor of Walk-In Refrigerator: Finish as specified above, to a smooth finish.

b. Floor of Gymnasium Locker Rooms: After floating, and while the surface is still plastic, provide a fine textured finish by drawing a fine fiber bristle broom uniformly over the surface in one direction only. Floors sloped for drainage should be brushed in the direction of flow.

3. Vertical concrete surfaces shall be finished smooth and free from marks or other surface defects.

3.05 CURING

A. Length of time, temperature and moisture conditions for curing concrete shall be in accordance with ACI 318, Section 5.11.

B. Forms containing concrete, top of concrete between forms, and exposed concrete surfaces after removal of forms shall be maintained in a thoroughly wet condition for at least 7 consecutive days after placing.

C. If weather is hot or surface has dried out, spray surface of concrete slabs and paving with fine mist of water, starting not later than 2 hours after final troweling and continuing until sunset. Surface of finish shall be kept continuously wet until curing medium has been installed.

D. Immediately after finishing, monolithic floor slabs shall be covered with curing paper. Paper shall be lapped 4 inches at joints and sealed with waterproof sealer. Edges shall be cemented to finish. Repair or replace paper damaged during construction operations.

E. When curing slabs with proactive water vapor emission and alkalinity control system:

1. Coordinate and schedule application of curing compound with concrete pour schedule, while conforming to manufacturer’s application instructions.

2. When the surface of the concrete has hardened sufficiently to sustain foot traffic pre-cure slabs with liquefied product application following manufacturer’s written instructions. Application shall be by trained applicators.

3. Monitor Environmental Conditions: Set up weather station 20 to 30 inches above freshly placed concrete. Record temperature, humidity and wind velocity measurements at 15 minute maximum intervals.

4. Calculate Evaporation Rate: Use recorded weather information in combination with nomograph per ACI 308R, Figure 4.1, Guide to Curing Concrete, to evaluate relevant evaporation rate.

5. When the bleed water rate of the concrete is approximately equal to the surface water evaporation rate, spray curing compound material throughout surface of

slabs and decks, following manufacturer's written instructions. Application shall be by trained applicators.

6. Perform the following tests at least 28 days after placement of concrete and prior to floor covering installation. Submit to OAR test results indicating locations that do not comply with scheduled flooring installation requirements.

   a. Calcium chloride testing per ASTM F1869.

   b. Relative humidity testing per ASTM F2170.

   c. Alkalinity testing per ASTM F710.

   d. Perform concrete bond layer humidity meter testing to determine substrate surface acceptability.

7. Areas emitting moisture and alkalinity at rates exceeding floor covering manufacturer's published ASTM F1869 limits, shall receive a corrective coating, at no cost to the OWNER, as follows:

   a) Mask and protect adjacent walls and floor surfaces from effects of scarification and application of remedial treatment.

   b) Scarify slab surface in area of application by shot blasting or other method acceptable to corrective coating manufacturer.

   c) Prepare and fill cracks, control joints and cold joints.

   d) Apply two-component modified epoxy penetrant and coating with roller and squeegee over required treatment area; saturate surfaces to ensure a through mechanical bond.

   e) Clean and fill divots, chips, voids and other surface irregularities with one hundred percent Portland cement based patching compound or cementitious fill.

   f) Apply cementitious surfacing over coating in areas to receive resilient and wood floor coverings to facilitate adhesion; apply to a thickness of 1/8 inch.

3.06 FILLING, LEVELING AND PATCHING

A. Concrete slabs exhibiting high or low spots and indicated to receive resilient floor covering or soft floor covering, shall have surfaces repaired. High spots shall be honed, or ground with power-driven machines to required tolerances. Low spots shall be filled with latex underlayment, installed in strict accordance with manufacturer's written recommendations.

B. Holes resulting from form ties or sleeve nuts shall be solidly packed, through exterior walls, by pressure grouting with cement grout, as specified. Grouted holes on exposed surfaces shall be screeded flush and finished to match adjoining surfaces.

C. Cement Base: Cement base shall be of the height, thickness, and shape detailed. Base shall be reinforced with one inch mesh, 18 gage, zinc-coated wire fabric. Base finish mixture shall be one part Portland cement, 2 parts of fine aggregate and one part pea gravel. Colored cement base shall include a chemically inert mineral oxide pigment in the mix.

3.07 FINISHING

A. Soda and Acid Wash: Concrete surfaces to receive plaster, paint or other finish, and which have been formed by oil coated forms, shall be scrubbed with a solution of 1-1/2 pounds of caustic soda to one gallon of water. Surfaces where smooth wood or waste molds have been furnished shall be scrubbed with a solution of 20 percent muriatic acid. Wash with clean water after scrubbing.

B. Sacking: Exposed concrete curbs, walls, and other surfaces shall be sacked by an application of Portland cement grout, floated, and rubbed. Sacking shall not be performed until patching and filling of holes has been completed. Entire sacking operation for any continuous area shall be started and completed within the same day.

1. Mix one part Portland cement and 1-1/2 parts fine sand with sufficient water to produce a grout having consistency of thick paint. Wet surface of concrete sufficiently to prevent absorption of water from grout. Apply grout uniformly with a brush or spray gun, then immediately float surface with a cork or other suitable float, scouring wall vigorously.

2. While grout is still plastic, finish surface with a sponge-rubber float, removing excess grout. Allow surface to dry thoroughly, then rub vigorously with dry burlap to completely remove dried grout. No visible film or grout shall remain after rubbing with burlap.

C. Sandblasting: Exterior concrete surfaces to receive stucco dash coat finish, where plywood or other smooth forms have been furnished, shall be uniformly sand-blasted with sharp quartz sand under sufficient air pressure to remove dirt, form oil and other foreign materials, and roughen surface to provide a proper bond. Such surfaces shall be thoroughly washed with clean water after sandblasting.

D. Abrasive: Concrete stair treads, landings, ramps and steps on interior and exterior of buildings, and interior exposed concrete floors in shop buildings shall receive an abrasive finish.

E. Floor Hardener: Exposed interior concrete floors throughout shall be treated with floor hardener.

1. Protect adjacent surfaces. Clean surfaces to receive treatment in accordance with manufacturer's instructions, ensuring that all stains, oil, grease, form release agents, laitance, dust and dirt are removed prior to application.

2. Apply hardener in accordance with manufacturer's instructions as soon as concrete is firm enough to work on after final troweling.

F. Cement Grout and Dry-Pack Concrete: Cement grout shall be mixed at the Project site and shall be composed of one volume of Portland cement and 2-1/2 volumes of fine aggregate. Materials shall be mixed dry with sufficient water added to make mixture flow under its own weight. When grout is used as a dry pack concrete, add sufficient water to provide a stiff mixture, which can be molded into a sphere.

G. Broom Finish: Exterior stair treads and landings shall be provided with a non-slip broom finish in addition to abrasive finish specified.

H. Abrasive Stair Nosing: Nosing shall be installed according to manufacturers written recommendations.

3.08 EXPANSION AND CONSTRUCTION JOINTS

A. Construction Joints: Details and proposed location of construction joints shall be as indicated on the Drawings, located to least impair strength of structure, in accordance with the following:

1. Thoroughly clean contact surface by sand blasting entire surface not earlier than 5 days after initial placement.

2. A mix containing same proportion of sand and cement provided in concrete plus a maximum of 50 percent of coarse aggregate shall be placed to a depth of at least one inch on horizontal joints. Vertical joints shall be wetted and coated with a neat cement grout immediately before placing of new concrete.

3. Should contact surface become coated with earth, sawdust, or deleterious material of any kind after being cleaned, entire surface shall be re-cleaned before applying mix.

B. Expansion Joints: Provide expansion joints where indicated in walks and exterior slabs. Space approximately 20 feet apart, unless otherwise indicated. Joints shall extend entirely through slab with joint filler in one piece for width of walk or slab. Joint filler shall be 3/8 inch thick, unless otherwise indicated.

C. Tooled Joints: Slabs, walks and paving shall be marked into areas as indicated with markings made with a V-grooving tool. Marks shall be round-edged, free from burrs or obstructions, with clean cut angles and shall be straight and true. Walks, if not indicated, shall be marked off into rectangles of not more than 12 square feet and shall have a center marking where more than 5 feet wide.

3.09 TESTING

A. Molded Cylinder Tests:

1. Inspector or testing lab personnel will prepare cylinders and perform slump tests. Samples for concrete strength shall be taken in accordance to ASTM C172. Each cylinder shall be dated, given a number, point in structure from which sample was obtained, mix design number, mix design strength and result of accompanying slump test noted.

2. Separate tests of molded concrete cylinders obtained at same place and time shall be made at age of three days, seven days, and 28 days. A strength test shall be the average of the compressive strength of two cylinders, obtained from the same sample of concrete and tested at 28 days or at test age designated for determination of f'c.

3. Test cylinders shall be prepared at the Project site and stored in testing laboratory in accordance with ASTM C31, and tested in accordance with ASTM C39.

B. Core Test: At request of the ARCHITECT, cores of hardened concrete shall be cut from portions of hydrated structures for testing, in accordance with CBC and ASTM C42.

1. Provide 4 inch diameter cores at representative places throughout the structure as designated by the ARCHITECT.

2. In general, provide sufficient cores to represent concrete placed with at least one core for each 4,000 square feet of building area, and at least 3 cores total for each Project.

3. Where cores have been removed, fill voids with drypack, and patch the finish to match the adjacent existing surfaces.

C. Concrete Consistency: Measure consistency according to ASTM C143. Test twice each day or partial day's run of the mixer.

D. Adjustment of Mix: If the strength of any grade of concrete for any portion of Work, as indicated by molded test cylinders, falls below minimum 28 days compressive strength specified or indicated, adjust mix design for remaining portion of construction so that resulting concrete meets minimum strength requirements.

E. Air Content Testing: Measure in accordance to ASTM C173 or ASTM C231, for each composite sample taken in accordance to ASTM C172.

F. Defective Concrete:

1. Should strength of any grade of concrete, for any portion of Work indicated by tests of molded cylinders and core tests, fall below minimum 28 days strength specified or indicated, concrete will be deemed defective Work and shall be

replaced or adequately strengthened in a manner acceptable to the ARCHITECT and City.

2. Concrete Work that is not formed as indicated, is not true within 1/250 of span, not true to intended alignment, not plumb or level where so intended, not true to intended grades and levels, contains sawdust shavings, wood or embedded debris, or does not fully conform to Contract provisions, shall be deemed to be defective Work and shall be removed and replaced.

G. Concrete for Equipment Pads, Mechanical and Electrical Work: Unless otherwise indicated, strength shall have a minimum $f'c$ = 3,000 psi. Exposed concrete shall be provided with a hand trowel finish with radius corners and edges. Form and place concrete where necessary as described in Section 03 1000 Concrete Forming and Accessories, and reinforced as described in Section 03 2000 Concrete Reinforcing. Calcium chloride shall not be furnished in any concrete mix provided for the installation of underground electrical conduits. For concrete encasement of more than one conduit, furnish 3/4 inch maximum aggregate.

3.10 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project site.

3.11 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 033510
POLISHED CONCRETE FINISHING

PART 1 - GENERAL

1.1 SUMMARY

1. Section Includes:
   a. Polished concrete finishing, including staining and scoring to match existing condition.

B. Related Sections:
1. Section 033000: Cast-in-Place Concrete

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each type of product requiring color selection.

1.3 QUALITY ASSURANCE

A. Field Sample Panels: After approval of samples, produce field sample panels to demonstrate the approved range of selections made under Sample submittals. Produce a minimum of three sets of full-scale panels, approximately 48 by 48 inches minimum, to demonstrate the expected range of finish, color, and appearance variations.
1. Locate panels as indicated or, if not indicated, as directed by Architect.
2. Maintain field sample panels during construction in an undisturbed condition as a standard for judging the completed Work.
3. Demolish and remove field sample panels when directed.
4. removed to ensure no water leakage or damage occurs to structure or interior areas of existing building.

PART 2 - PRODUCTS

2.1 STAIN MATERIALS

A. Reactive Stain: Acidic-based stain with wetting agents and high-grade, UV-stable metallic salts that react with calcium hydroxide in cured concrete to produce permanent, variegated, or translucent color effects.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>

B. Penetrating Stain: Water-based, acrylic latex, penetrating stain with colorfast pigments.
1. <Double click here to find, evaluate, and insert list of manufacturers and products.>

2.2 LIQUID FLOOR TREATMENTS

A. 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. <Double click here to find, evaluate, and insert list of manufacturers and products.>

PART 3 - EXECUTION

3.1 POLISHING

A. Polish: [Level 2: Low sheen, 400 grit] [Level 3: High sheen, 800 grit] [Level 4: Gloss shine, 3000 grit].

B. Apply polished concrete finish system to cured and prepared slabs.
1. Machine grind floor surfaces to receive polished finishes level and smooth.
2. Apply reactive stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
3. 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.
4. Apply penetrating stain for polished concrete in polishing sequence and according to manufacturer's written instructions.
5. Continue polishing with progressively finer-grit diamond polishing pads to gloss level, to match approved mockup.
6. Control and dispose of waste products produced by grinding and polishing operations.
7. Neutralize and clean polished floor surfaces.

3.2 STAINING

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring as necessary and be responsible for safety and support of structure. Assume liability for such movement, settlement, damage, or injury.

D. Cover and protect furniture, equipment, and fixtures scheduled to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.

E. Utilities:
1. Mark and identify location of utilities to be disconnected.
2. Notify affected utility company in advance of date and time when service needs to be disconnected.
3. Disconnect and cap utility services; Comply with requirements of governing authorities.
4. Do not commence demolition operations until associated disconnections have been completed.

F. During removal of existing roofing, provide proper protection from falling objects over entrance which are to be kept open during normal working hours.

END OF SECTION 033510

SECTION 04 2200
CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Concrete masonry units.

2. Reinforcing steel.

3. Mortar, grout and grouting.

4. Bolts, anchors, hardware, metal frames, and other insert items.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 01 4523 - Testing and Inspection.

3. Section 03 1000 - Concrete Forming and Accessories.

4. Section 03 2000 - Concrete Reinforcing.

5. Section 03 3000 - Cast-In-Place Concrete.

6. Section 05 1000 - Structural Steel Framing.

7. Section 08 1113 - Hollow Metal Doors and Frames.

1.02 REFERENCES

A. American Society for Testing and Materials International (ASTM):

1. ASTM A307 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.

2. ASTM C90 - Standard Specification for Load Bearing Concrete Masonry Units.

3. ASTM C94 - Standard Specification for Ready-Mixed Concrete.

4. ASTM C140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

5. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar.

6. ASTM C150 - Standard Specification for Portland Cement.

7. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes.

8. ASTM C270 - Standard Specification for Mortar for Unit Masonry.

9. ASTM C404 - Standard Specification for Aggregates for Masonry Grout.

10. ASTM C426 - Standard Test Method for Linear Drying Shrinkage of Concrete Masonry Units.

11. ASTM C476 - Standard Specification for Grout for Masonry.

12. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry.

13. ASTM C1019 - Standard Test Method for Sampling and Testing Grout.

14. ASTM C1314 - Standard Test Method for Compressive Strength of Masonry Prisms.

15. ASTM C1586 – Standard Guide for Quality Assurance of Mortars.

B. Masonry Standards Joint Committee (MSJC), the Masonry Society (TMS), American Concrete Institute (ACI) and American Society of Civil Engineers (ASCE).

1. TMS 602/ACI 530.1/ASCE 6 – Specification for Masonry Structures.

2. TMS 402/ACI 530/ASCE 5 – Building Code Requirements for Masonry Structures.

1.03 SUBMITTALS

A. Mix Design: Submit grout and mortar mix designs. Mix designs shall be signed and sealed by a Civil or Structural Engineer registered in the State of California.

B. Product Data: Submit manufacturer's Product Data for assembly components, materials, and accessories. Submit certificates and data assuring that the proposed materials meet the specified ASTM standards.

C. Samples: Submit Samples for each type of required masonry unit, including reinforcement and accessories.

D. Shop Drawings: Indicate wall reinforcement, splice locations and bending diagrams.

E. Admixtures: Additives and admixtures to mortar and grout shall not be used unless approved by the enforcing agency. Submit product data for any proposed admixture.

1.04 REGULATORY REQUIREMENTS

A. Perform the Work in accordance with CBC, Chapter 21.

B. Comply with requirements of TMS 602.

1.05 QUALITY ASSURANCE

A. Comply with the requirements of Section 01 4523 - Testing and Inspection.

B. Concrete Masonry Units:

1. Notify the testing laboratory a minimum of 45 days in advance of installing concrete unit masonry, to allow for preconstruction testing of the units.

a. Units will be sampled and tested in accordance with ASTM C140 for compressive strength, absorption and moisture content.

b. Units will be sampled and tested in accordance with ASTM C426 for linear drying shrinkage.

2. The material testing laboratory shall receive concrete masonry unit specimens for testing from masonry unit manufacturer. Number of specimens shall be as indicated in referenced ASTM standard tests. Testing laboratory will perform and send test results to the ARCHITECT and Project Inspector.

C. Portland Cement: Submit certification from the cement manufacturer that the cement proposed for use on the project has been manufactured in accordance with ASTM C150. Certification shall include test results made on cement samples during production.

D. Mortar and Grout Tests: Prior to the beginning of masonry work, mortar and grout will be tested, unless prism tests will be performed as indicated below.

1. Mortar: Shall conform to ASTM C270 Table 2 for Type S mortar.

a. Provide qualifications of mortar as meeting ASTM C270 at the beginning of the job and whenever mix design is changed.

b. Mortars will be evaluated during preconstruction and tested during construction for proportioning or compressive strength in accordance to ASTM C780.

2. Grout: Shall conform to ASTM C476, and will be tested in accordance with ASTM C1019. Compressive strength shall equal or exceed specified compressive strength (*f'm*) at 28 days, but not less than 2,000 psi.

a. Ready-Mix Grout: Grout manufacturer shall furnish batch ticket information in accordance to ASTM C94.

E. Prism Test: The compressive strength of concrete masonry will be determined by the prism test method prior to the start of construction and during construction.

F. Masonry Core Testing: Core testing will be performed in accordance with CBC, Section 2105.4.

G. Inspection During Installation: A special inspector will continuously observe the installation of reinforced masonry. The Project Inspector shall be responsible for monitoring the work of the special inspector and testing laboratories to ensure that the testing program is satisfactorily completed.

H. OWNER will be responsible for the costs of original tests and inspection.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store units above grade on level platforms or pallets, in a dry location.

B. Store cementitious materials and aggregates in such a manner as to prevent deterioration or intrusion of foreign matter or moisture.

C. Handle units on pallets or flat bed barrows. Free discharge from conveyor units or transportation in mortar trays is not permitted.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Concrete Unit Masonry: Modular medium weight conforming to ASTM C90, hollow load-bearing concrete unit masonry. Masonry units shall meet the minimum compressive strength requirements of ASTM C90, or as indicated on project drawings, whichever is greater.

1. Concrete masonry unit sizes shall be as indicated on the drawings.

2. Provide open-end units at walls to be fully grouted.

3. Provide closed-end units at walls and at openings where ends will be exposed in finish Work; provide bond beam blocks where horizontal reinforcement is indicated.

4. Provide special shapes and accessory units at locations indicated on Drawings.

5. Provide units in colors and textures as indicated in the drawings.

6. Masonry unit shall have been cured for a minimum of 28 days.

7. Masonry unit shall have maximum liner shrinkage of 0.065 percent from saturated to oven dry.

B. Portland Cement: ASTM C150, Type II, from one source.

C. Hydrated Lime: ASTM C207, Type S.

D. Aggregates: ASTM C144 for mortar and ASTM C404 for grout.

E. Mortar: ASTM C270, Type S, conforming to the property specifications of CBC Table 2103.8 (2).

F. Grout: ASTM C476.

G. Admixture for Grout: Grout Aid, as manufactured by Sika Chemical Corp., or equal.

H. Water: Clean, potable, free from substances deleterious to mortar, grout or reinforcement.

I. Reinforcing Steel: Provide and install reinforcing steel in accordance with Section 03 2000 - Concrete Reinforcing.

J. Cleaning Materials: Sure Klean No. 600 detergent by ProSoCo.

K. Miscellaneous Materials: As required to complete the Work.

L. Anchor Bolts: Shall be hex headed bolts conforming to ASTM A307 Grade A with the dimensions of the hex head conforming to ANSI/ASME B18.2.1.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Discard units with cracks or other defects not complying with requirements of ASTM C 90.

3.02 CONSTRUCTION

A. Construct per applicable provisions of CBC and TMS 602.

B. Conform to TMS 602 for hot and cold weather masonry construction.

3.03 MORTAR AND GROUT MIXING

A. Mortar: Shall provide a minimum strength of 1,800 psi.

B. Grout: Shall provide a minimum strength of 2,000 psi or as indicated in the drawings, whichever is higher. Grout space requirements for coarse and fine grouts shall be per Table 7 of TMS 602. Add Sika Chemical Corp. Grout Aid per manufacturer's instructions.

C. Measurements: Measure in calibrated devices that can be checked at any time.

1. Add water for workable consistency.

2. Shovel measurements are not permitted.

D. Mixing: Mix in accordance to TMS 602.

1. Mortar: Mix cementitious materials and aggregates between three and five minutes in a mechanically operated mixer. Mix dry ingredients with a sufficient amount of water to provide a workable mix. Batches of less than one sack of cement, and fractional sack batches are not permitted.

2. Factory Blended Mortar: Mix in accordance with manufacturer's recommendations.

3. Grout: Add sufficient water for a workable mix that will flow into all voids of the masonry without separation or segregation. Grout slump shall be between 8 and 11 inches.

E. Re-tempering Time Limit: Use mortar within 2 ½ hours after mixing. Discard any mortar that has been mixed longer or that has begun to set. If necessary re-temper within this time limit, by replacing only water lost due to evaporation and by thoroughly remixing.

3.04 INSTALLATION OF MASONRY UNITS

A. Workmanship: Install masonry plumb and true to line with straight level joints of uniform thickness. Comply with TMS 602 tolerances. Maintain masonry clean during and after installation.

1. Lay-out and incorporate embedded hardware items.

2. Assist other trades with built-in items, which require cutting and fitting of masonry.

3. Cut block units with a diamond saw or carborundum wheel. Trowel or chisel cutting is not permitted.

4. Keep cavities clear of droppings and debris. Remove droppings prior to grouting.

B. Reinforcing Steel: Install as indicated on Drawings. Except as otherwise indicated, install reinforcement in accordance with standards of Concrete Reinforcing Steel Institute and to requirements specified in Section 03 2000 - Concrete Reinforcing. Do not splice vertical reinforcement except where indicated on the Drawings.

C. Shoring: Provide temporary shoring for lintels with sufficient strength to carry load without deflecting. Remove temporary shoring not less than 28 days after masonry has been installed.

D. Block Installation: Clean dirt and dust from surfaces before installation. Do not wet masonry units.

1. Foundation preparation: Clean top surface of concrete foundation of dirt, projections and laitance before starting masonry construction. Wet saw cutting of units immediately prior to laying is permitted.

2. Install masonry with mortar to required joint thickness. Install blocks with 3/8-inch mortar bed. Fill head joints solid, install tightly to adjoining units. Provide 3/8-inch joint thickness.

a. Hold racking to a minimum.

b. No toothing is permitted.

c. If it becomes necessary to move a unit after it has been installed, remove the unit, discard the mortar, and install the unit in fresh mortar.

3. Anchor Bolts: Provide 1/2-inch minimum grout space between bolts and masonry.

4. Bond: Unless otherwise indicated, install units in common running bond.

5. Finish Joint Treatment: Unless otherwise indicated, cut both interior and exterior joints flush, and tool slightly concave to a dense, uniform surface.

6. Grouting: Unless noted otherwise on Drawings, completely fill cells with grout.

E. Steel Door Frames:

1. Locate door frames accurately, install plumb, Set frames to floor with powder driven or expansion anchors to floor surface and brace in position before start of masonry installation.

a. Frames are specified to be furnished with adjustable anchors.

b. Fill interior of frames solid with mortar or grout as walls are constructed.

2. Provide temporary wood spreaders from jamb to jamb and from head to floor to ensure that jambs do not bow-in, distort from a straight line, or deflect from superimposed loads during construction.

3.05 GROUTING

A. Prior to grouting all cells shall be cleaned so that all spaces to be filled with grout do not contain mortar projections greater than 1/4 inch, loose mortar or foreign material.

B. Grout materials and water contents shall be controlled to provide adequate fluidity for placement without segregation of the constituents, and shall be mixed thoroughly. Reinforcement shall be properly positioned and solidly embedded in the grout.

C. The grouting of any section of wall shall be completed in one day with no interruptions greater than one hour.

D. Between grout pours, a horizontal control joint shall be formed by stopping all wythes at the same elevation and with the grout stopping at 1 ½ inches below a mortar joint, except at the top of the wall. Where bond beams occur, the grout pour shall be stopped a minimum of ½ inch below the top of the masonry.

3.06 LOW-LIFT GROUTING FOR HOLLOW MASONRY UNITS

A. Grouting shall meet the requirements of CBC Section 2104.1.3.

B. After mortar joints have set, cells are cleaned of mortar and debris, and reinforcement is installed and inspected, grout cells in 4-foot maximum lifts. Horizontal and vertical reinforcement shall be held in place within permitted tolerances by suitable devices.

C. Grout may be installed by pump, tremie or bucket, using hoppers to avoid spilling on exposed surfaces.

D. All grout shall be consolidated and reconsolidated with a mechanical vibrator after placing so as to completely fill all voids and to consolidate the grout. Grouted walls shall be solid and without voids.

3.07 HIGH-LIFT GROUTING OPTION FOR HOLLOW MASONRY UNITS

A. Grouting shall meet the requirements of CBC Section 2104.1.3.

B. High-lift grouting shall apply only to cell sizes available with 8 inch and wider block units. This method is subject to approval of the City.

C. Provide bond beam units, inverted for start course, and omit alternate blocks or remove entire face shell of every other unit to allow access to all cells on bottom course for cleanouts.

D. Plug each cleanout by setting a face shell in mortar into opening and securely bracing it in place to prevent displacement. If masonry is not exposed in finish Work, cleanouts may be formed.

E. Grouting: Grouting shall be done in a continuous pour in lifts not exceeding 5-foot in height. The grouting of any section of a wall between control barriers shall be completed in one day, with no interruptions greater than one hour.

F. Consolidating: Grout shall be consolidated by mechanical vibration only, and shall be reconsolidated after excess moisture has been absorbed, but before plasticity is lost. Vibrating of reinforcing steel is not permitted.

3.08 CURING

A. Remove efflorescence, stains, debris, excess grout, and foreign matter.

B. During curing, or for any other purpose, do not saturate masonry with water.

3.09 PARGE COAT

A. Apply parge coat to the earth side of surfaces that are to receive waterproofing.

B. A Portland cement and sand mix (1:3.5 by volume) or Type S mortar may be used for the parge coat.

C. Parging should be applied to damp (not saturated) concrete masonry in two 1/4 inch thick layers. The first coat should be roughened when partially set, hardened for 24 hours, and then moistened before second coat is applied. The second coat should be trowelled to a smooth, dense surface.

D. The parge coat should be beveled at the top to form a wash, and thickened at the bottom to form a cove between the base of the wall and the top of footing.

3.10 CLEANING

A. At completion of masonry Work, remove misplaced mortar, grout or other foreign substances, and clean surfaces which will be exposed in finish Work with specified cleaner, or with clean water and stiff fiber brushes.

B. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.11 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes treatment work consisting of cleaning existing concrete masonry unit surfaces.

1.2 DEFINITIONS

A. Low-Pressure Spray:

1. Pressure: 100 to 400psi.
2. Flow Rate: 4 to 6 gpm.

B. Medium-Pressure Spray:

1. Pressure: 400 to 800 psi.
2. Flow Rate: 4 to 6 gpm.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review minutes of Preliminary Historic Treatment Conference that pertain to masonry historic treatment and cleaning.
2. Review methods and procedures related to cleaning historic masonry.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 QUALITY ASSURANCE

A. Historic Treatment Specialist Qualifications: A qualified historic masonry cleaning specialist. Experience cleaning new masonry work is insufficient experience for historic treatment work.

B. Mockups: Prepare mockups of cleaning on existing surfaces to demonstrate aesthetic effects and to set quality standards for materials and execution.

1. Cleaning: Clean an area approximately 25 sq. ft. for each type of masonry and surface condition.

PART 2 - PRODUCTS

2.1 CLEANING MATERIALS

A. Water: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Detergent Solution, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 1/2 cup of laundry detergent, and 20 quarts of hot water for every 5 gal. of solution required.

D. Mold, Mildew, and Algae Remover, Job Mixed: Solution prepared by mixing 2 cups of tetrasodium pyrophosphate (TSPP), 5 quarts of 5 percent sodium hypochlorite (bleach), and 15 quarts of hot water for every 5 gal. of solution required.

E. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

F. Mild-Acid Cleaner: Manufacturer's standard mild-acid cleaner based on phosphoric, oxalic, or citric acid; but not containing muriatic (hydrochloric), hydrofluoric, or sulfuric acid; or ammonium bifluoride or chlorine bleaches.

PART 3 - EXECUTION

3.1 PROTECTION

A. Remove downspouts and associated hardware adjacent to immediate work area and store during masonry cleaning. Reinstall when masonry cleaning is complete.

1. Provide temporary rain drainage during work to direct water away from building.

3.2 CLEANING MASONRY, GENERAL

A. Have cleaning work performed only by qualified historic treatment specialist.

B. Proceed with cleaning in an orderly manner. Ensure that dirty residues and rinse water do not wash over dry, cleaned surfaces.

C. Use only those cleaning methods indicated for each masonry material and location.

1. Brushes: Do not use wire brushes or brushes that are not resistant to chemical cleaner being used.
2. Spray Equipment: Use spray equipment that provides controlled application at volume and pressure indicated, measured at nozzle. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.

a. Equip units with pressure gauges.
b. For water-spray application, use fan-shaped spray that disperses water at an angle of 25 to 50 degrees.
c. For heated water-spray application, use equipment capable of maintaining temperature between 140 and 160 deg F at flow rates indicated.

D. Perform each cleaning method in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

1. Keep wall wet below area being cleaned to prevent streaking from runoff.

E. Water-Spray Application Method: Unless otherwise indicated, hold spray nozzle at least 6 inches from masonry surface, and apply water in horizontal back-and-forth sweeping motion, overlapping previous strokes to produce uniform coverage.

3.3 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing remaining growth to dry as long as possible before removal. Remove loose soil and plant debris from open masonry joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to planned cleaning methods. Extraneous substances include paint, caulking, asphalt, and tar.

1. Carefully remove heavy accumulations of rigid materials from masonry surface with sharp chisel. Do not scratch or chip masonry surface.
2. Remove paint and caulking with [alkaline paint remover].

    a. Comply with requirements in "Paint Removal" Article.
    b. Repeat application up to two times if needed.

3. Remove asphalt and tar with solvent-type paste paint remover

    a. Comply with requirements in "Paint Removal" Article.
    b. Apply paint remover only to asphalt and tar by brush without prewetting.
    c. Allow paint remover to remain on surface for 10 to 30 minutes.
    d. Repeat application if needed.

3.4 PAINT REMOVAL

A. Paint-Remover Application, General: Apply paint removers according to paint-remover manufacturer's written instructions. Do not allow paint removers to remain on surface for periods longer than those indicated or recommended in writing by manufacturer.

B. Paint Removal with Solvent-Type Paste Paint Remover:

1. Remove loose and peeling paint using low -pressure water spray, scrapers, stiff brushes, or a combination of these. Let surface dry thoroughly.
2. Apply thick coating of paint remover to painted surface with natural-fiber cleaning brush, deep-nap roller, or large paint brush. Apply in one or two coats according to manufacturer's written instructions.
3. Allow paint remover to remain on surface for period recommended in writing by manufacturer.
4. Rinse with [cold] [hot] water applied by low-pressure spray to remove chemicals and paint residue.

3.5 CLEANING BRICKWORK

A. Detergent Cleaning:

1. Wet surface with [cold] [hot] water applied by low-pressure spray.
2. Scrub surface with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that surface remains wet.
3. Rinse with [cold] [hot] water applied by low-pressure spray to remove detergent solution and soil.
4. Repeat cleaning procedure, where needed to produce cleaning effect established by mockup.

B. Mold, Mildew, and Algae Removal:

1. Wet surface with [cold] [hot] water applied by low-pressure spray.
2. Apply mold, mildew, and algae remover by brush or low-pressure spray.
3. Scrub surface with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that surface remains wet.
4. Rinse with [cold] [hot] water applied by [low] [medium]-pressure spray to remove mold, mildew, and algae remover and soil.
5. Repeat cleaning procedure, where needed to produce cleaning effect established by mockup.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage[paint-remover manufacturer's and] chemical-cleaner manufacturer's factory-authorized service representatives for consultation and Project-site inspection and provide on-site assistance when requested by Architect. Have[paint-remover manufacturer's and] chemical-cleaner manufacturer's factory-authorized service representatives visit Project site not less than once to observe progress and quality of the Work.

SECTION 05 0513

HOT-DIP GALVANIZING

THE STANDARD FOR STEEL EXPOSED TO WEATHER IS HOT-DIP GALVANIZED. HIGH PERFORMANCE COATINGS SHALL NOT BE USED IN LIEU OF GALVANIZING. AT DESIGNERS OPTION GALVANIZED STEEL MEMBERS MAY BE PAINTED OR POWDER COATED.

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Hot-dip galvanizing of structural steel articles.
2. Hot-dip galvanizing of steel stairs and railings.
3. Hot-dip galvanizing of fabricated steel assemblies.
4. Preparation of galvanized steel fabrications for painting.

B. Related Sections:

1. Division 01 - General Requirements.
2. Section 05 1200: Structural Steel Framing.
3. Section 05 5000: Metal Fabrications.
4. Section 05 5100: Metal Stairs and Railings.
5. Section 09 9000: Painting and Coating.

1.02 REFERENCES

A. American Galvanizers Association (AGA):

1. Inspection of Products Hot-dip Galvanized after Fabrication.
2. The Design of Products to be Hot-dip Galvanized after Fabrication.
3. Recommended Details of Galvanized Structures.
4. Suggested Specifications for Paint Preparation Galvanized Structures.
5. Preparing Hot Dip Galvanizing for Paint.
6. Preparing Hot-Dip Galvanized Steel for Powder Coating.

7. Wet Storage Stain.

B. ASTM International (ASTM):

1. ASTM A123 – Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

2. ASTM A143 – Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

3. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

4. ASTM A384 – Standard Practice for Safeguarding Against Warpage and Distortion during Hot-Dip Galvanizing of Steel Assemblies.

5. ASTM A385 – Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip).

6. ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

7. ASTM B6 – Standard Specification for Zinc.

8. ASTM B201 – Standard Practice for Testing Chromate Coatings on Zinc and Cadmium Surfaces.

9. ASTM D6386 – Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Painting.

10. ASTM D7803 - Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating.

11. ASTM E376 - Measuring Coating Thickness by Magnetic-Field or Eddy-Current (Electromagnetic) Test Methods.

C. The Society for Protective Coatings (SSPC):

1. SSPC-SP1 – Solvent Cleaning.

2. SSPC-SP2 – Hand Tool Cleaning.

3. SSPC-SP3 – Power Tool Cleaning, for surfaces to receive paint or powder coating.

4. SSPC-SP5 – White Metal Blast Cleaning.

5. SSPC-SP10 – Near White Blast Cleaning.

6. SSPC-SP16 - Brush-Off Blast Cleaning of Coated and Uncoated Galvanized Steel, Stainless Steels, and Non-Ferrous Metals.

1.03 COORDINATION WITH STEEL FABRICATOR

A. Prior to fabrication, steel fabricators shall submit approved fabrication shop drawings to the galvanizer. The Galvanizer shall review fabricator shop drawings for suitability of materials for galvanizing and coatings and coordinate required fabrication modifications.

B. Steel Fabricator shall notify the galvanizer of steel fabrications that exceed the ASTM A385 recommended percentages for carbon, phosphorus, manganese and silicon, so special galvanizing processing techniques are used. Galvanizer may request material test reports (MTRs) or metallurgical assays from fabricator.

C. Coordinate with steel fabricator appropriate marking and masking materials.

D. Coordinate modifications needed to the fabrications to accommodate lifting and handling during galvanizing.

1.04 QUALITY ASSURANCE

A. Coating Applicator: Company specializing in hot-dip galvanizing after fabrication following the procedures in the Quality Assurance Manual of the American Galvanizers Association.

B. Galvanizer shall have an in-plant inspection program designed to maintain the coating thickness, finish, and appearance within the requirements of this Section.

1.05 SUBMITTALS

A. Galvanizing Certificate of Compliance: Submit to OAR notarized Certificate of Compliance with ASTM standards and specifications herein listed, noting exception for intentional bare areas. The Certificate shall be signed by the galvanizer and contain a detailed description of the material processed.

B. When galvanizer prepares the surfaces of fabrications that will receive paint or powder coating over galvanizing provide statement indicating conformance with ASTM D6386 or D7803, as applicable.

1.06 DELIVERY, STORAGE AND HANDLING

A. Package and handle galvanized material in a manner which will avoid damage to the zinc coating.

B. Store in dry, well-ventilated conditions until shipping.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Steel for Galvanizing: As specified in Sections:

1. Section 05 1200: Structural Steel Framing.

2. Section 05 5000: Metal Fabrications.

3. Section 05 5100: Metal Stairs and Railings.

B. Zinc for Galvanizing: Conform to ASTM B6, as specified in ASTM A123.

PART 3 – EXECUTION

3.01 PREPARATION

A. Remove welding slag, splatter, anti-splatter compounds and burrs remaining in steel articles. If anti-spatter sprays are utilized, they shall be water-soluble or solvent-based.

B. Provide drainage and venting holes in tubular assemblies. In thicker material drill holes in place of punching. Holes shall have a relatively uniform circumference. Punched holes or burned holes with a plasma torch shall be treated with a drill to even the diameter to appropriate size.

C. Masking installed by steel fabricator shall remain in place through galvanizing process completion.

D. Provide lifting holes or lugs to allow for handling during galvanizing. Avoid the use of chains or wires directly connected to steel articles to be duplexed or architecturally exposed.

E. Safeguard against warpage or distortion of steel members in accordance with ASTM A384.

F. Pre-clean steel work in accordance with accepted methods to produce an acceptable surface for quality hot-dip galvanizing. Remove surface contaminants and coatings that are not removable by the normal chemical cleaning process in the galvanizing operation by grit-blasting, sand-blasting, or other mechanical means.

G. Markings and stickers from fabrication or shipping that will interfere with galvanizing adhesion shall be removed prior to beginning the galvanizing process.

3.02 COATING APPLICATION

A. Galvanize steel articles, fabrications and assemblies by the hot-dip process in accordance with ASTM A123. The zinc used in the galvanizing bath shall conform to ASTM Specification B6. The molten metal in the working volume of the galvanizing bath shall contain at least 98.0 % zinc by weight.

B. Galvanize bolts, nuts, washers and iron and steel hardware components in accordance with ASTM A153.

C. Safeguard products against steel embrittlement in conformance with ASTM A143.

D. Surface preparation requirements shall be performed in accordance to ASTM D7803 or D6386 but also in accordance with the paint manufacturer's requirements and recommendations.

3.03 COATING REQUIREMENTS

A. Conform to paragraph 6.1 of ASTM A123, or Table 1 of ASTM A153, as applicable.

B. Surface Finish: Conform to paragraph 6.2 of ASTM A123, or Paragraph 5 of ASTM A153, as applicable.

C. Adhesion: Withstand normal handling consistent with the nature and thickness of the coating and normal use of the article.

3.04 TESTS

A. Inspection and testing of hot-dip galvanized coatings shall be done under the guidelines provided in the AGA publication Inspection of Products Hot-dip Galvanized after Fabrication.

B. Test in accordance with ASTM A123, or A153, as applicable, to determine the thickness of the zinc coating on the metal surface.

C. During the visual inspection, if adhesion concerns are suspected, such as peeling or flaking of the galvanized coating, then adhesion testing using the stout knife method shall be conducted. Embrittlement testing is required when there is evidence of embrittlement and shall be conducted per the requirements of ASTM A143.

D. Upon completion of tests furnish notarized Certificate of Compliance with ASTM standards and specifications as indicated in Article 1.05 Submittals.

3.05 REPAIR OF DAMAGED COATINGS

A. Smooth out icicles by hand filing or power sanding the area without removing any more zinc coating than necessary. Smooth out rough and bumpy surface of fabrications to be painted, powder coated or are indicated as architecturally exposed.

B. Remove lifting lugs and repair coating as indicated below.

C. Repair areas damaged at the galvanizing facility using zinc rich paints, zinc-based solders or metalizing methods in accordance with ASTM A780, and meeting the minimum repair thickness in accordance with ASTM A123 and ASTM A153.

3.06 PREPARATION FOR TOP COATING

A. Galvanized fabrications indicated on the drawings to be painted shall be prepared in accordance with ASTM D6386 and the American Galvanizers Association (AGA)

Suggested Specifications for Paint Preparation Galvanized Structures. For field painting refer to Section 09 9000, Painting and Coating.

B. Galvanized fabrications indicated on the drawings to be powder coated shall be prepared in accordance with ASTM D7803.

C. Galvanizer shall ensure water quenching and chromate passivation are not performed. for fabrications scheduled for duplex coatings.

END OF SECTION

SECTION 05 1200

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Structural steel.

2. Architecturally exposed structural steel.

IF ARCHITECTURALLY EXPOSED STRUCTURAL STEEL (AESS) IS USED, AESS MEMBERS MUST BE CLEARLY IDENTIFIED IN THE DRAWINGS. REFER TO AISC SPECIFICATIONS FOR STRUCTURAL STEEL BUILDINGS AND BRIDGES, SECTION 10, AND TO AISC AESS SUPPLEMENT TO MODERN STEEL CONSTRUCTION, MAY 2003, FOR GUIDANCE FOR SPECIFYING AESS, AND TO AISC AESS COST MATRIX FOR INFORMATION ON FABRICATION AND ERECTION COST INCREASES.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 01 4523 - Testing and Inspection.

3. Section 03 3000 - Cast-In-Place Concrete.

4. Section 04 2200 - Concrete Unit Masonry.

5. Section 05 0513 – Hot-Dip Galvanizing.

6. Section 05 1000 – Metal Stairs and Railings.

7. Section 05 3000 - Metal Decking.

8. Section 05 4100 – Cold Formed Metal Framing.

9. Section 05 5000 - Metal Fabrications.

10. Section 07 8116 - Cementitious Fireproofing.

11. Section 09 9000 - Paints and Coatings.

12. Section 26 3100 – Photovoltaic Systems.

1.02 REFERENCES

A. CBC Chapter 22.

B. American Institute of Steel Construction (AISC):

1. AISC – Steel Construction Manual:

a. AISC 360 Specifications for Structural Steel Buildings.

b. AISC Code of Standard Practice for Steel Buildings and Bridges.

c. RCSC Specification for Structural Joints Using High Strength Bolts.

2. AISC 341 - Seismic Provisions for Structural Steel Buildings.

3. AISC 358 - Prequalified Connections for Special and Intermediate Steel Moment Frames for Seismic Applications.

C. ASTM International (ASTM):

1. ASTM A36 – Standard Specification for Carbon Structural Steel.

2. ASTM A53 – Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

3. ASTM A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.

4. ASTM A123 – Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

5. ASTM A153 – Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

6. ASTM A307 – Standard Specification for Carbon Steel Bolts and Studs, and Threaded Rod 60000 PSI Tensile Strength.

7. ASTM A435 - Standard Specification for Straight-Beam Ultrasonic Examination of Steel Plates.

8. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Shapes.

9. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

10. ASTM A572 – Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

11. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

12. ASTM A673 - Standard Specification for Sampling Procedure for Impact Testing of Structural Steel.

13. ASTM A780 - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

14. ASTM A992 – Standard Specification for Structural Steel Shapes.

15. ASTM C1107 – Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

16. ASTM E23 - Standard Test Methods for Notched Bar Impact Testing of Metallic Materials.

17. ASTM E112 - Standard Test Methods for Determining Average Grain Size.

18. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi (830 MPa) and 150 ksi (1040 MPa) Minimum Tensile Strength, Inch and Metric Dimensions.

19. ASTM F436 – Standard Specification for Hardened Steel Washers Inch and Metric Dimensions.

20. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners, Inch and Metric Series.

21. ASTM F1554 – Standard Specification for Anchor Bolts, Steel, 36, 55 and 105-Ksi Yield Strength.

22. ASTM F1852 – Standard Specification for Twist Off Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.

D. American Welding Society (AWS):

1. AWS D1.1 – Structural Welding Code - Steel.

2. AWS D1.8 – Structural Welding Code – Seismic Supplement.

3. AWS A2.4 – Standard Symbols for Welding, Brazing, and Nondestructive Examination.

4. AWS B2.1 – Base Metal Grouping for Welding Procedure and Performance Qualification.

E. SSPC – Steel Structures Painting Council:

1. SSPC-SP2 - Hand Tool Cleaning.

2. SSPC-PA-1 - Shop, Field and Maintenance Coating of Metals.

1.03 REGULATORY REQUIREMENTS

A. Structural steel shall conform to CBC requirements, except that steel manufactured by acid Bessemer process is not permitted for structural purposes.

B. Sheet and strip steel other than those listed in CBC, if provided for structural purpose, shall comply with City requirements.

1.04 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings, including complete details and schedules for fabrication and shop assembly of members, and details, schedules, procedures and diagrams showing the sequence of erection. Fully detail minor connections and fastenings not shown or specified in the Contract Documents to meet required conditions using similar detailing as shown in the Contract Documents. Include a fully detailed, well controlled sequence and technique plan for shop and field welding that minimizes locked in stresses and distortion; submit sequence and technique plan for review by the ARCHITECT.

1. Include details of cuts, connections, camber, and holes in accordance with Figure 4.5 of AWS D1.1 or AISC Chapter J, weld position plan and other pertinent data. Indicate welds by standard AWS symbols, and show size, length and type of each weld.

2. Provide setting drawings, templates, and directions for installation of anchor bolts and other anchorages to be installed for Work specified in other sections.

3. Erection and Bracing Plan and Erection Procedure: Submit an erection and framing plan, including columns, beams, and girders, signed and sealed by a Structural or Civil Engineer registered in the State of California in accordance with Title 8 California Code of Regulations, Section 1710, Structural Steel Erection. Maintain a copy at the Project site as required by the California Division of Industrial Safety.

4. Submit a list of steel items to be galvanized.

5. Include identification and details of Architecturally Exposed Structural Steel (AESS) members, if applicable.

B. Product Data: Submit copies of fabricator’s specifications and installation instructions for the following products. Include laboratory test reports and other data required demonstrating compliance with these Specifications:

1. Structural steel, each type; including certified copies of mill reports covering chemical and physical properties.

2. Welding electrodes.

3. Welding gas.

4. Unfinished bolts and nuts.

5. Structural steel primer paint.

6. High-strength bolts, including nuts and washers.

C. Manufacturer's Mill Certificate: Submit, certifying that products meet or exceed specified requirements.

D. Mill Test Reports: Submit manufacturer's certificates, indicating structural yield and tensile strength, destructive and non-destructive test analysis.

E. Welding Procedure Specifications (WPS): Submit weld procedures for all welding on project to OWNER's testing laboratory for approval. After approval by testing laboratory, submit to ARCHITECT for Record. Weld procedures shall be qualified as described in AWS D1.1, AISC 341 and AISC 358, as applicable. Weld procedures shall indicate joints details and tolerances, preheat and interpass temperature, post-heat treatment, single or multiple stringer passes, peening of stringer passes for groove welds except for the first and the last pass, electrode type and size, welding current, polarity and amperes and root treatment. The welding variables for each stringer pass shall be recorded and averaged; from these averages the weld heat input shall be calculated. Submit the manufacturer's product data sheet for all welding material used.

F. Welder's Certificates: Field welders shall be Project certified in accordance with AWS D1.1. Shop welders shall be Project certified for FCAW in accordance with AWS D1.1.

G. Test Reports: Submit reports of tests conducted on shop and field welded and bolted connections. Include data on type of test conducted and test results.

H. Welding Material Certification: Provide certificate that welding material complies with specifications. Submit to OWNER's testing laboratory.

1.05 QUALITY ASSURANCE

A. Comply with the following as a minimum requirement, except as otherwise indicated:

1. American Institute of Steel Construction (AISC) "Code of Standard Practice for Steel Buildings and Bridges, modified as follows:

a. Replace “Structural Design Drawings” with “Contract Documents’ throughout the document.

b. Paragraph 3.2 is hereby modified in its entirety as follows: “Contract Documents including but not limited to architectural, mechanical, plumbing, electrical, civil and kitchen design drawings and specifications shall be used as supplement to the structural plans to define configurations and construction information.”

c. Delete Paragraph 3.3.

d. In Paragraph 4.4, delete the following sentence: “These drawings shall be returned to the Fabricator within 14 calendar days.”

e. Delete Paragraph 4.4.1.(a) in its entirety.

f. Paragraph 4.4.2 is hereby modified in its entirety as follows: “No review action, implicit or explicit, shall be interpreted to authorize changes in the Contract Documents.”

2. Perform welding in accordance with AWS Standards, AWS D1.1, and California Building Code Section 2204A.1 and approved Weld Procedure Specifications (WPS).

B. Shop fabrication shall be inspected in accordance with CBC.

C. Erect mock-up panel of fabricated structural steel meeting Architecturally Exposed Structural Steel (AESS) tolerances for exposed areas. Approval by ARCHITECT is required. Mock-up to remain for comparison but may not be left as part of the work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store structural steel above grade on platforms, skids or other supports.

B. Protect steel from corrosion.

C. Store welding electrodes in accordance with AWS D 12.1.

D. Store other materials in a weather-tight and dry place until installed into the Work.

PART 2 - PRODUCTS

2.01 GENERAL

A. Stock Materials: Provide exact materials, sections, shapes, thickness, sizes, weights, and details of construction indicated on Drawings. Changes because of material stock or shop practices will be considered if net area of shape or section is not reduced

thereby, if material and structural properties are at least equivalent, and if overall dimensions are not exceeded.

B. Shapes, bars, plates, tubes and pipes shall be made of materials with at least 16 percent recycled content if produced from Basic Oxygen Furnace (BOF) or at least 67 percent recycled content if produced from Electric Arc Furnace (EAF).

2.02 MATERIALS

A. Structural Steel: Wide flange shapes shall conform to ASTM A992 grade 50. Other steel shall conform to ASTM A36.

B. Unfinished Threaded Fasteners: ASTM A307, Grade A, regular low carbon bolts and nuts.

C. High-Strength Threaded Fasteners: ASTM F3125 or ASTM F959 quenched and tempered, steel bolts, nuts and washers.

D. Primers: Lead-free metal primer:

1. SSPC-Paint 20, Zinc-Rich Coating Inorganic and Organic.

2. SSPC-Paint 23, Latex Primer for Steel Surfaces.

E. Steel Pipe: ASTM A53, Type E or S, Grade B.

F. Structural Tubing:

1. Hot-formed, ASTM A501.

2. Cold-formed, ASTM A500, Grade B.

G. Galvanizing: ASTM A123.

H. connections. Comply with AISC 341.

I. Shear Stud Connectors: Refer to Section 05 3000 Metal Decking.

J. Grout: ASTM C1107, non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7,000 psi at seven days; of consistency suitable for application and a 30 minute working time.

2.03 FABRICATION

A. Fabricate in accordance with AISC Code of Standard Practice for Steel Buildings and Bridges and AISC 360.

B. Cleaning and Straightening Materials: Materials being fabricated shall be thoroughly cleaned of scale and rust and straightened before fabrication. Cleaning and straightening methods shall not damage material. After punching or fabrication of component parts of a member, twists or bends shall be removed before parts are assembled.

C. Cutting, Punching, Drilling and Tapping: Unless otherwise indicated or specified, structural steel fabricator shall perform the cutting, punching, drilling and tapping of Work so that Work of other trades will properly connect to steel Work.

D. Milling: Compression joints depending on contact bearing shall be furnished with bearing surfaces prepared to a common plane by milling.

E. Use of Burning Torch: Oxygen cutting of members shall be performed by machine. Gouges greater than 3/16 inch that remain from cutting shall be removed by grinding. Reentrant corners shall be shaped notch free to a radius of at least 1/2 inch. Gas cutting of holes for bolts or rivets is not permitted.

STEEL MEMBERS EXPOSED TO THE EXTERIOR, SUCH AS LUNCH SHELTERS, ARCADES, BALCONIES, GRANDSTANDS, PHOTOVOLTAIC SYSTEM STRUCTURES AND OTHER UNENCLOSED SPACES, SHALL BE HOT-DIP GALVANIZED PER SECTION 050513. HIGH PERFORMANCE COATINGS SHALL NOT BE USED IN LIEU OF GALVANIZING. INDICATE IN THE DRAWINGS THE STEEL MEMBERS TO BE GALVANIZED. INTERIOR STEEL SHALL BE SHOP PRIME PAINTED. ADDITIONAL PAINTING SHOULD BE CROSS REFERENCED TO 09 9000.

F. Galvanizing: After fabrication, items indicated or specified to be galvanized shall be galvanized per Section 05 5013, Hot-Dip Galvanizing.

G. Welding:

1. Type of steel furnished in welded structures shall provide chemical properties suitable for welding as determined by chemical analysis. Welds shall conform to the verification and inspection requirements of CBC Chapter 17. Conform to AWS D1.1, and CBC Chapter 22.

2. Materials and workmanship shall conform to the requirements specified herein and to CBC requirements, modified as follows:

   a. No welded splices shall be permitted except those indicated on Drawings unless specifically reviewed by the ARCHITECT.

   b. Drawings will designate joints in which it is important that welding sequence and technique be controlled to minimize shrinkage stresses and distortion.

3. Welding shall be performed in accordance with requirements of the AWS Structural Welding Code.

4. Architecturally Exposed Structural Steel: Verify that weld sizes, fabrication sequence, and equipment used for Architecturally Exposed Structural Steel will limit distortions to allowable tolerances. Prevent surface bleeding of back-side welding on exposed steel surfaces. Grind smooth exposed fillet welds ½ inch and larger. Grind flush butt welds. Dress exposed welds.

5. Remove erection bolts on welded, Architecturally Exposed Structural Steel; fill holes with plug welds; and grind smooth at exposed surfaces.

H. Shop Finish:

1. Notify the Project Inspector when Work is ready to receive shop prime coat. Work shall be inspected by the Project Inspector before installation of primer.

2. Structural steel and fittings shall receive a coat of primer, except:

a. Surfaces that will be galvanized.

b. Surfaces that will be fireproofed.

c. Surfaces that will be field welded.

d. Surfaces in contact with concrete.

e. Surfaces high strength bolted.

3. The primer specified shall be spray applied, filling joints and corners and covering surfaces with a smooth unbroken film. The minimum dry film thickness of the primer shall be 2.0 mils.

I. Comply with fabrication tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel.

J. Fabricate Architecturally Exposed Structural Steel with exposed surfaces smooth, square, and free of surfaces blemishes, including pitting, rust and scale seam marks, roller marks, rolled trade names, and roughness.

1. Remove blemishes by filling, grinding, or by welding and grinding, prior to cleaning, treating and shop priming.

2. Comply with fabrication requirements, including tolerance limits of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for Architecturally Exposed Structural Steel.

K. Architecturally Exposed Structural Steel: use special care in unloading, handling and erecting the steel to avoid marking or distorting the steel members. Minimize damage to any shop paint when temporary braces or erection clips are used. Avoid unsightly

surfaces upon removal. Grind smooth tack welds and holes filled with weld metal or body solder. Plan and execute all operations in such a manner that the close fit and neat appearance of the structure will not be impaired.

2.04 SHOP AND FIELD QUALITY CONTROL

A. A special inspector, approved by City to inspect the Work of this section, shall inspect high-strength bolted connections. OWNER will provide a City approved independent testing laboratory to perform tests and prepare test reports in accordance with CBC 1704. The Project Inspector shall be responsible for monitoring the work of the special inspector and testing laboratories to ensure that the testing program is satisfactorily completed.

B. An AWS certified welding inspector (CWI), approved by City to inspect the Work of this section, shall inspect welded connections in accordance with CBC 1705.2.5. The OWNER will provide a City approved independent testing laboratory to perform tests and prepare test reports. The Project Inspector shall be responsible for monitoring the work of the special inspector and testing laboratories to ensure that the testing program is satisfactorily completed.

C. The independent testing laboratory shall conduct and interpret test and state in each report whether test specimens comply with requirements, and specifically state any deviations there from.

D. Provide access to all places where structural steel Work is being fabricated or produced so required inspection and testing can be performed.

E. The independent testing laboratory may inspect or test structural steel at plant before shipment; however, ARCHITECT reserves the right at any time before Contract Completion to deem materials not in compliance with the specified requirements as defective Work.

F. Correct defects in structural Work when inspections and laboratory test reports indicate noncompliance with specified requirements. Perform additional tests as may be required to reconfirm noncompliance of original Work, and as may be required to show demonstrate compliance of corrected Work.

G. Inspection of Structural Tube Steel/Hollow Structural Sections (HSS): Structural tube steel members (round, square, rectangular), disregarding steel origin, will be inspected during shop fabrication. Inspector will perform a visual examination of the seam weld area for visible discontinuities. When defects are suspected, non-destructive testing will be considered.

H. Welding: Inspect and test during fabrication and erection of structural steel assemblies as follows:

1. Certify welders and conduct inspections and tests as required. Record types and locations of defects found in the Work. Record Work required and performed to correct deficiencies.

2. Inspect welds. Welds shall be visually inspected before performing any non-destructive testing. Groove weld shall be inspected by ultrasonic or other approved non-destructive test methods.

3. Ultrasonic testing shall be performed by a specially trained and qualified technician who shall operate the equipment, examine welds, and maintain a record of welds examined, defects found, and disposition of each defect. Repair and test defective welds.

4. Rate of Testing: Completed welds contained in joints and splices shall be tested 100 percent either by ultrasonic testing or by radiography.

5. Welds, when installed in column splices, shall be tested by either ultrasonic testing or radiography.

6. Base metal thicker than 1 ½-inch, when subjected to through-thickness weld shrinkage strains, shall be ultrasonically inspected by shear wave methods for discontinuities directly behind such welds. Tests shall be performed at least 48 hours after completed joint has cooled down to ambient air temperature.

7. Material discontinuities shall be reviewed based on the defect rating in accordance with the criteria of AWS D1.1 table 6.3 by the ARCHITECT and City.

8. Other method of non-destructive testing and inspection, for example, liquid dye penetrate testing, magnetic particle inspection or radiographic inspection may be performed on weld if required.

9. Lamellar Tearing: Lamellar-tearing resulting from welding is a crack (with zero tolerance) and shall be repaired in accordance with AWS D1.1.

10. Lamination: The rejection criteria shall be based on ASTM A435.

11. Where testing reveals lamination or conditions of lamellar tearing in base metal, the steel fabricator shall submit a proposed method of repair for review by the ARCHITECT. Test repaired areas as required.

12. Magnetic Particle Testing: Magnetic particle testing when required shall be provided in accordance with AWS D1.1 for procedure and technique. The standards of acceptance shall be in accordance with AWS D1.1 – Qualification.

I. Lamellar Tearing: Prior to welding plates 1 to 1-½ inch thick and greater and rolled shapes within the distance from 6 inches above the top of the joint to 6 inches below

the bottom of the joint shall be checked by ultrasonic testing for laminations in base metal which may interfere with the inspection of the completed joint. Should these defects occur, members will be reviewed by the ARCHITECT and City. Welding procedure specifications in paragraph 1.04.G specify welding practices to minimize lamellar tearing.

J. Prior Testing of Base Material: Test material before fabrication.

K. Lines and levels of erected steel shall be certified by a State of California licensed surveyor as set forth in related Division 01 Section.

L. Record Drawings: After steel has been erected, correct or revise Shop Drawings and erection diagrams to correspond with reviewed changes performed in the field.

PART 3 - EXECUTION

3.01 PREPARATION

A. Verify governing dimensions and conditions of the Work before commencing erection Work.

1. Report discrepancies between drawings and field dimensions to ARCHITECT before commencing work.

2. Beginning of installation means erector accepts existing conditions and surfaces underlying or adjacent to work of this section.

B. Provide temporary shoring and bracing, and other support during performance of the Work. Remove after steel is in place and connected, and after cast-in-place concrete has reached its design strength.

C. Coordinate prime coat repair and application with requirements of Section 09 9000.

3.02 ERECTION

A. Install structural steel accurately in locations, to elevations indicated, and according to AISC specifications and CBC requirements.

B. Clean surfaces of base plates and bearing plates.

1. Install base and bearing plates for structural members on wedges, shims, or setting nuts as required.

2. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims; cut off flush with edge of base or bearing plate before packing with grout.

C. Maintain erection tolerances of structural steel within AISC Code of Standard Practice for Steel Buildings and Bridges.

1. Architecturally Exposed Structural Steel members and components, plumbed, leveled and aligned to a tolerance not to exceed one-half the amount permitted for structural steel. CONTRACTOR to provide adjustable connections between Architecturally Exposed Structural Steel and the structural steel frame or the masonry or concrete supports, in order to provide the erector with means for adjustment.

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact after assembly. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure.

E. Do not permit thermal cutting during erection of structural steel.

F. Where indicated for field connections, provide standard bolts complying with ASTM A307.

G. Install high strength steel bolts at locations indicated. Assembly and installation shall be in accordance with CBC requirements and AISC specifications.

1. Allowable hole sizes: 1/16 inch larger than bolt size.

2. Use friction type connection with standard hardened steel circular, square or rectangular washer under bolt nut.

3. Thoroughly clean area under bolt head, nut and washer. Remove all paint, lacquer, oil or other coatings except organic zinc-rich paints in accordance with SSPC, SP-2.

4. Tighten bolts by power torque wrench or hand wrench until twist-off.

H. CONTRACTOR shall be responsible for correcting detailing and fabrication errors and for correct fitting of all members and components.

I. Erect structural steel plumb and level and to proper tolerances as set forth in the AISC Manual. Provide temporary bracing, supports or connections required for complete safety of structure until final permanent connections are installed.

J. Install column bases within a tolerance of 1/8 inch of detailed centerlines, level at proper elevations. Support bases on double nuts and solidly fill spaces under bases with cement grout.

K. Provide anchor bolts with templates and diagrams. CONTRACTOR shall be responsible for proper location and installation of bolts. Correct deficiencies and errors.

3.03 FITTING

A. Closely fit members, finished true to line and in precise position required to allow accurate erection and proper joining in the field.

B. Drilling to enlarge unfair holes will not be allowed. Allow only enough drifting during assembly to bring parts into position, but not enough to enlarge holes or distort the metal. Do not heat rolled sections, unless approved by ARCHITECT.

3.04 PUNCHING AND DRILLING

A. Punch material 1/16 inch larger than nominal diameter of bolt, wherever thickness of metal is equal to or less than the diameter of the bolt plus 1/8 inch.

B. Drill or sub-punch and ream where metal is equal to or more than the diameter of the bolt plus 1/8 inch. Make diameter for sub-punched and sub-drilled holes 1/16 inch larger than nominal diameter of bolt.

C. Precisely locate holes to ensure passage of bolt through assembled materials without drifting. Enlarge holes when necessary to receive bolts by reaming; flame cutting to enlarge holes is not acceptable. Structural Steel members with poorly matched holes will be rejected.

3.05 FINISHING

A. After erection, spots or surfaces where paint has been removed, damaged, or burned off, and field rivets, bolts, and other field connections shall be cleaned of dirt, oil, grease, and burned paint and furnished with a spot coat of the same primer installed during shop priming.

B. Touchup:

1. Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint. Install paint to exposed areas with the same material installed during shop painting. Install by brush or spray to provide a minimum dry film thickness of 1.5 mils.

2. Touch Up Damaged Painted Finishes: Comply with SSPC-PA-1 for touch-up; apply with brush to produce a minimum 2.0 mil dry film thickness.

3. Galvanized Surfaces: Clean field welds, connections and damaged areas.

   a. Apply two coats of Carbomastic 15 or a zinc rich coating in conformance with ASTM A780 and approved by OWNER’s OEHS. Brush or roll to a 4 to 6 mil thickness.

   b. Apply Galva-Guard Galvanizing Repair Solder or other zinc-based solders in conformance with ASTM A780.

   c. Apply metalizing methods in accordance with ASTM A780.

3.06 FIELD QUALITY CONTROL

A. OWNER will provide a special inspector and independent testing laboratory to perform field inspections and tests and to prepare test reports.

B. Correct deficiencies in or remove and replace structural steel that inspections and test reports indicate do not comply with specified requirements.

3.07 CLEAN UP

A. Remove rubbish, debris and waste materials and legally dispose of off the Project Site.

3.08 PROTECTION

A. Protect the Work of this section until Substantial Completion.

3.09 HANDLING

A. Both in shop and in the field, transport, handle and erect to prevent damage or overstressing of any component.

END OF SECTION

SECTION 05 3000

METAL DECKING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Floor and roof metal decking.
2. Shear connector studs for composite decking construction.
3. Edge strips, closure strips and decking accessories.
4. Galvanizing repair materials.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 01 4523 - Testing and Inspection.
3. Section 03 3000 – Cast-In-Place Concrete.
4. Section 05 1200 - Structural Steel Framing.
5. Section 07 6000 - Flashing and Sheet Metal.
6. Section 07 8116 - Cementitious Fireproofing.

1.02 REFERENCES

A. ASTM International (ASTM):

1. ASTM A108 – Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished.
2. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
3. ASTM A780 – Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings.

4. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

5. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact.

6. ASTM D1056 - Standard Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.

B. American Welding Society (AWS):

1. AWS D1.1 - Structural Welding Code Sheet – Steel.

2. AWS D1.3 – Structural Welding Code Sheet – Sheet Steel.

C. American Iron and Steel Construction (AISI):

1. AISI S100 – North American Specifications for the Design of Cold-Formed Steel Structural Members.

D. Underwriters Laboratory (UL):

1. UL – Fire Resistance Directory.

1.03 PERFORMANCE REQUIREMENTS

A. Compute properties of deck sections on basis of effective design width as limited by provisions of the AISI specifications. Provide no less than deck section properties specified, including section modulus and moment of inertia per foot of width.

B. Regulatory Requirements:

1. Decking installed as part of a fire rated assembly shall meet the requirements of the applicable UL Fire Resistance Directory design number.

2. Work of this section shall be in accordance with CBC.

1.04 SUBMITTALS

A. Shop Drawings: Drawings, sections and details indicate type of decking, location, finish, gage of metal, arrangement of sheets, orientation of metal deck, openings, lapping, edge closures, flashing, method of attachment, and special supports for a complete installation.

B. Product Data:

1. Metal Decking: For each type of decking specified, provide structural properties, dimensions, thickness, profiles and finishes. Submit product data for accessories

2. Galvanizing Repair Paint: Submit manufacturer's product data.

C. ICC-ES / IAPMOES Evaluation Report: Submit report for each type of metal decking used in the project.

D. Welder and Powder-Actuated Tool Operator Certificates: Signed by CONTRACTOR certifying that welders and powder actuated tool operators comply with the requirements specified under Article "Quality Assurance".

1.05 QUALITY ASSURANCE

A. General: Metal decking steel shall conform to the requirements, strengths and properties of the standards specified.

B. Welders and Operators Qualifications:

1. Welders: Properly certified in accordance with AWS D1.3 for the type of Work involved in compliance with CBC requirements.

2. Operators of low velocity powder-actuated tools shall be certified by the tool manufacturer.

C. Continuous inspection of welding will be performed by a special inspector, approved by City to inspect the Work of this Section. Refer to Section 01 4523 - Testing and Inspection. The Project Inspector will be responsible for monitoring the work of the special inspector to ensure that the inspection program is satisfactorily completed.

D. Identification of metal decking steel shall conform to the standards specified in this Section and the Drawings.

1. Fabricator shall furnish sufficient evidence to the ARCHITECT attesting compliance with specified requirements.

2. Conform to CBC requirements. Unclassified or unidentified decking is not permitted. Furnish deck manufacturer's certified mill analyses and test reports for each heat covering decking having a minimum Fy of 33 Ksi. In addition, for decking having F_y greater than 33 Ksi, testing laboratory shall perform one tension and elongation test and one bend or flattening test for each gage.

E. Unidentifiable Steel: Steel which is not readily identifiable as to grade from markings and test records is not permitted to be provided as part of the Work of this Section.

F. Manufacturers shall be members of Steel Deck Institute (SDI).

1.06 DELIVERY, STORAGE AND HANDLING

A. Protect steel deck from corrosion, deformation and other damage during delivery, storage and handling.

B. Deck bundles shall be stored off the ground, with one end elevated to provide drainage. Bundles shall be protected against condensation with a ventilated waterproof covering.

C. Repair deck finish using touch-up paint. Replace damaged material.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. ASC Steel Deck.

B. Verco Decking Inc.

C. Epic Metals Corporation.

D. Equal.

2.02 MATERIALS

A. Metal Decking:

1. Roll-formed sheets conforming to ASTM A653, with G90 zinc coating. Composite steel decking shall be fabricated with integrally embossed or raised pattern ribs.

2. Section properties conforming to applicable provisions of latest edition of AISI, Specification for the Design of Cold-Formed Steel Structural Members.

B. Flexible Closure Strips for Deck: Vulcanized, closed-cell, expanded chloroprene elastomer, complying with ASTM D1056, Grade SCE #41.

1. Brittleness Temperature: Minus 40 degrees F, ASTM D746.

2. Flammability Resistance: Self-extinguishing,

C. Decking Accessories: Metal cover plates, sheet metal edging, metal closure strips, valley and ridge strips, seat angles, sump pans, flashings: 22 gage minimum, with ASTM A653, G90 zinc coating.

D. Shear Connectors: Headed stud type, ASTM A108 Grade 1010 to 1020, cold-finished carbon steel complying with AISC specifications.

E. Galvanizing Repair Paint: Carbomastic 15, by Carboline or equal product approved by the OWNER's Office of Environmental Health and Safety (OEHS).

2.03 FABRICATION

A. Corrugated sheets or sections shall be designed to support required live load between supporting members.

B. Provide decking in lengths to span over three or more supports.

C. Except as detailed otherwise, provide decking with interlocking side laps, 2 1/2-inch minimum end bearing, and 1 1/2-inch minimum side bearing.

D. Welding and Mechanical Fastening: Provide materials and methods in accordance with recommendations of steel decking manufacturer and reviewed submittals. Hold decking tight to the supporting elements with screws or other means for proper welding or crimping of the decking edges. Conform to AWS D1.3, and to the patterns and weld types indicated, with welds free from sharp edges and protrusions. Field coat welds and abraded surfaces at completion with Carbomastic 15 or an anodic type galvanizing repair paint approved by the OEHS. Omit the field paint coating where welds or abrasions are covered by concrete fill or sprayed fireproofing.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify supporting structure and existing conditions prior to starting work.

B. Remove oil, dirt, paint, and rust from steel surfaces to which metal decking will be welded.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 OPENINGS

A. Cut or drill openings and holes and reinforce units to provide openings which are indicated on the Drawings.

B. Provide openings, or other Work related not indicated on the Drawings.

3.03 INSTALLATION

A. Install metal decking in accordance with decking manufacturers' recommendations, requirements of Drawings, Shop Drawings, and Specifications.

B. Install metal decking on supporting steel framework and adjust to final position before permanently fastening in place.

1. Install each unit to proper bearing on supports.

2. Install units in straight alignment for entire length of run of cells with close registration of cells of one unit with those of abutting unit.

C. Fasten decking to steel framework at ends of units and at intermediate supports.

1. Welding shall be in accordance with AWS D1.3 and as indicated on Drawings.

2. Mechanical Fastening:

a. Drive powder-actuated fasteners with a low-velocity piston tool by an authorized operator of the powder-actuated tool manufacturer.

b. Drive pneumatically driven fasteners with a low-velocity fastening tool and in conformance with the manufacturer's recommendations.

c. Drive screws to properly clamp deck to supporting steel.

D. Fasten side laps between supports as indicated on Drawings.

E. Perform field cutting parallel with cells in area between cells, leaving sufficient horizontal material to permit welding to support steel.

F. Weld shear connectors to supports thru decking units as per AWS D1.1 and as required by Drawings. Weld only on clean, dry surfaces. Do not weld shear connectors thru two layers of decking units.

G. Ridge, Valley and Closure Strips for Roof Decks:

1. Weld or fasten plates to top surface of roof decking. Lap end joints a minimum 3 inch. For valley plates, provide end laps in the direction of water flow.

2. Provide closure strips at open, uncovered ends and edges of the roof decking. Install closure strips in position in a manner to provide a weathertight installation.

H. Place sump pans over openings in roof decking and weld to top surface of roof decking. Do not exceed spacing of welds of 12 inch with, not less than one weld at each corner. Field cut opening in the bottom of each roof sump pan to receive the roof drains.

3.04 METAL FLASHINGS AND CLOSURES

A. Furnish, install, and weld or fasten in position, sheet metal closure flashing, closure angles, closure plates, profile plates, and shear plates.

B. Close open ends of cell runs at columns, openings, walls, similar interruptions and termination.

3.05 FIELD QUALITY CONTROL

A. Install steel decking under continuous inspection according to CBC Section 1704.

B. Welding inspection for steel deck diaphragms shall conform to CBC Section 2204.1.

3.06 TOUCH-UP PAINT

A. After decking installation, wire brush, clean, and touchup paint the scarred areas on top and bottom surfaces of metal roof decking with galvanizing repair paint.

3.07 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.08 PROTECTION

A. Protect the Work of this Section until Substantial Completion.

END OF SECTION

SECTION 05 4100

STRUCTURAL METAL STUD FRAMING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cold formed metal framing for exterior framing, load bearing and curtainwall.

B. Related Requirements:

1. Division 01 - General Requirements.

2. Section 01 4523 - Testing and Inspection.

3. Section 05 1200 - Structural Steel Framing.

4. Section 05 3000 – Metal Decking.

5. Section 09 2216 - Non-Structural Metal Framing.

1.02 SUBMITTALS

A. Shop Drawings: Submit drawings showing framing, connection details, accessories and anchorage. Indicate location of assemblies, size and spacing of framing components.

B. Product Data: Submit manufacturer's catalog data for each item proposed for installation.

C. Certificates: Furnish manufacturer's certification that materials meet or exceed Specification requirements.

1.03 QUALITY ASSURANCE

A. Comply with the following requirements:

1. AISI S100 - Specifications for Design of Cold Formed Steel Structural Members.

2. Welds shall be performed by AWS certified welders. Welding shall be performed in accordance with requirements of American Welding Society (AWS) Structural Welding Code-Steel D1.1 and D1.3. Structural welding Code-Sheet Steel.

3. Welding shall be inspected by a special inspector, approved by City to inspect Work of this section. The Project Inspector shall be responsible for monitoring work of special inspector to ensure that inspection program is satisfactorily completed.

4. Manufacturer shall be a member of the Steel Framing Industry Association (SFIA) or the Steel Stud Manufacturers Association (SSMA).

1.04 REFERENCES

A. ASTM International:

1. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by Hot Dip Process.

2. ASTM A924 – Standard Specification for General Requirements for Steel Sheet Metallic-Coated by Hot-Dip Process.

3. ASTM A1003 – Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members.

4. ASTM A1008 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable.

5. ASTM C954 – Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.

6. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members.

7. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories.

8. ASTM E488 – Standard Test Methods for Strength of Anchors in Concrete Elements. .

9. ASTM E1190 – Standard Test Methods for Strength of Power-Actuated Fasteners Installed in Structural Members.

B. Tolerances: Install walls and partitions on straight lines, plumb, free of twists or other defects, and contacting a 10-foot straight edge for its entire length at any location within a 1/8 inch tolerance. Install horizontal framing level within a tolerance of 1/8 inch in 12 feet in any direction.

1.05 DELIVERY, STORAGE AND HANDLING

A. Materials shall be delivered in their original unopened packages and stored protected from damage. Do not store material directly on grade. Provide adequate support to prevent bowing of material prior to installation.

B. Store welding electrodes in accordance with AWS D12.1.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Provide studs, tracks, joists, header, and accessories manufactured by one of following:

1. ClarkDietrich.

2. Marino/WARE.

3. Cemco.

4. Equal.

B. Special Connection Accessories: Products manufactured by The Steel Network, Inc., ClarkDietrich or equal.

2.02 MATERIALS

A. Studs, tracks, slotted deflection tracks, furring channels, u-channels, z furring, angles, straps, clips, web stiffeners and miscellaneous members and accessories shall conform to the following:

1. Metal framing shall be formed from corrosion resistant-steel conforming to requirements of ASTM A653, 50 ksi minimum for 16 gauge and heavier and 33 ksi minimum for 18 gauge and lighter.

2. Protective Coating: G60 minimum per AISI S240 and ASTM C955.

3. Metal framing shall be manufactured in conformance to ASTM C955 or AISI S200.

B. Gauges and properties of studs shall be as indicated on Drawings.

C. Mechanical anchors to concrete and masonry shall be metal cinch at least 3/8 inch in diameter threaded bolt head type. Anchor bolts to be installed in concrete shall be hook type ½ inch diameter or more. Unless otherwise indicated.

D. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws. Use low-profile head beneath sheathing and gypsum board.

E. Accessories: Special top tracks, angles, fasteners, and strips of gypsum wallboard, as required for fire rating assembly required at each condition.

F. Mineral Wool Safing Insulation: 4.0 pcf density. Thermafiber, Fibrex, or equal.

PART 3 - EXECUTION

3.01 INSTALLATION

A. General Erection Requirements:

1. Install cold-formed framing in accordance with requirements of ASTM C1007.

2. Install in compliance with applicable sections of the AISI Standard for Cold-Formed Steel Framing General Provisions.

3. Welds shall conform to AWS D.1.3.

B. Examine structure, substrates and installation conditions. Do not proceed with metal stud framing installation until unsatisfactory conditions have been corrected.

C. Install plumb and true. Install necessary accessories for proper installation.

D. Anchor top and bottom runner track to structure overhead and to floor structure below.

E. Install studs squarely in top and bottom runner track with firm abutment against track webs.

F. Align and plumb studs and fasten to flanges of both top and bottom runner tracks.

G. Provide three studs minimum at corners of stud walls. Locate so as to provide surfaces for attachment of interior and exterior facing materials.

H. Members not indicated to be welded together shall be attached with manufacturer recommended screws with minimum one screw at each flange of stud to top and bottom track.

I. Wire tying of framing members is not permitted.

J. Provide lateral bracing and bridging in accordance with manufacturer's written recommendations or as required by CBC.

K. Intersecting walls and partitions, whether load bearing or not, shall be connected.

L. Splices in axially loaded studs are not permitted.

M. Splice or butt weld butt joints in runner tracks. No splices are permitted in tracks over lintels, diaphragm sheathing, or diagonal bracing.

N. Weld connections by fillet welds or plug welds in accordance with AWS recommended procedures and practices.

O. Touch-up field abrasions and welds with galvanizing touch-up material.

Studs that frame door openings shall be clipped to floor with 14 gage angle clips. Each clip to have two fasteners into studs and two fasteners into floor.

P. Provide additional joists or blocking adjacent to exterior and interior walls, openings and elsewhere as required to provide support for indicated ceiling construction.

Q. Provide an additional joist under parallel partitions where partition length exceeds ½ joist span and around floor and roof openings which interrupt one or more spanning members.

3.02 CONNECTIONS TO METAL DECKING

A. Provide premolded neoprene filler strips matching flute profile for non-fire-rated walls and partitions covered on one or both sides up to metal decking.

B. Top runner track of fire-rated partitions shall be a minimum of 36 mils (20 gage), unless noted otherwise, and attached to metal deck with required fasteners at spacing required for fire rating, but in no case over 16 inches on center. Areas above runner shall be friction fit with a minimum depth of 2 ½ inches of 4 pounds per cubic foot density mineral wool insulation. A minimum of ½ inch of firestopping compound shall be installed to each side of mineral wool insulation for a one-hour system, and one inch of firestopping for a two-hour system. Install required special tracks, angles, fasteners and strips of gypsum wallboard to provide required fire resistance rating.

C. Fire-rated top tracks shall be installed in accordance with manufacturer's recommendations and fire rating approval requirements.

3.03 QUALITY CONTROL

A. Welding Inspection:

1. Inspection of field welding operations shall be performed by special inspector.

2. The special inspector shall inspect material, equipment, procedures, welds, and welder qualifications.

3.04 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off Project site.

3.05 PROTECTION

A. Protect Work of this section until Substantial Completion.

END OF SECTION

SECTION 05 5000

METAL FABRICATIONS

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes: Metal fabrications:

1. Steel thresholds.
2. Steel ladders and ladder safety cages.
3. Elevator hoist way door sill angles,
4. Steel framing and supports for countertops.
5. Steel tube reinforcement for low partitions.
6. Steel framing and supports for mechanical and electrical equipment.
7. Steel Gates.
8. Gratings, frames and covers.
9. Steel bollards.
10. Embedded edge angles in concrete.
11. Steel supports for coiling doors.
12. Steel framing and supports for operable partitions.
13. Supportive framing for sunshade panels.
14. Miscellaneous steel framing, supporting angles, plates, brackets, clips, anchors and bolts for equipment, and other work which is not specifically included in Section 05 1200, Structural Steel Framing.
15. Miscellaneous fabrications, as indicated on the Drawings.

B. Related Requirements:

1. Division 01 - General Requirements.
2. Section 01 4523: Testing and Inspection.
3. Section 03 3000 – Cast-in-Place Concrete.
4. Section 04 2200: Concrete Unit Masonry.

5. Section 05 5013: Hot-Dip Galvanizing.

6. Section 05 1200: Structural Steel Framing.

7. Section 05 5100: Metal Stairs and Railings.

1.02 REFERENCES

A. ASTM International (ASTM):

1. ASTM A27 – Standard Specification for Steel Castings, Carbon, for General Application.

2. ASTM A36 – Standard Specification for Carbon Structural Steel.

3. ASTM A47 - Standard Specification for Ferritic Malleable Iron Castings.

4. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.

5. ASTM A123 - Standard Specification for Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

6. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

7. ASTM A283 - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates.

8. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength.

9. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

10. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

11. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts.

12. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

13. ASTM C1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink).

14. ASTM D1187 - Standard Specification for Asphalt-Base Emulsions for Use as Protective Coatings for Metal.

15. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength.

16. ASTM F2329 - Standard Specification for Zinc Coating, Hot-Dip, Requirements for Application to Carbon and Alloy Steel Bolts, Screws, Washers, Nuts, and Special Threaded Fasteners.

B. American Welding Society (AWS):

1. AWS D1.1 Structural Welding Code - Steel.

2. AWS D1.3 Structural Welding Code - Sheet Steel.

3. AWS D-19.0 Welding Zinc Coated Steel.

1.03 COORDINATION

A. Coordination between Steel Fabricator and Galvanizer:

1. Prior to fabrication, submit approved fabrication shop drawings to the galvanizer.

2. Notify galvanizer of steel fabrications that exceed the ASTM A385 recommended percentages for carbon, phosphorus, manganese and silicon, so special galvanizing processing techniques are used.

B. Coordinate installation of metal fabrications that are anchored to concrete or masonry, or that receive work specified by other Sections. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry.

C. Field Measurements: Field verify dimensions prior to fabrication.

D. Coordinate selection of shop primers with galvanizing, and with paintings to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and paintings are compatible with one another.

1.04 SUBMITTALS

A. Shop Drawings: Submit Shop Drawings indicating provided materials, dimensions, anchoring detail, and details of termination or connection to adjacent construction. Indicate items that are purchased from a manufacturer and items that are shop fabricated. Indicate component parts requiring Project site fabrication or assembly.

B. Product Data: Submit Product Data for manufactured items. Submit Product Data for primers and finishes.

C. Material Samples: Submit Samples of primers and finishes on fabricated items.

D. Fabricator qualifications per Article “Quality Assurance”.

E. Welding:

1. Welder's Certificates: Field welders shall be Project certified in accordance with AWS D1.1.

2. Welding Material Certification: Provide certificate that welding material complies with specifications.

F. Research/Evaluation Reports: ICC-ES for post-installed anchors.

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Firm with a minimum five year experience in successfully producing metal fabrications similar to that shown on the drawings.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D-1.1– Structural Welding Code – Steel.

2. AWS D1.3 - Structural Welding Code - Sheet Steel.

C. Inspection of Welding: Refer to Section 01 4523: Testing and Inspection.

D. Field applied primers, paintings, sealers and adhesives shall be approved by the OWNER's Office of Environmental Health and Safety (OEHS).

E. Preassemble items in shop to greatest extent possible to minimize field welding. Mark units for reassembly and coordination of installation. Use marking method compatible with galvanizing.

1.06 DELIVERY, STORAGE AND HANDLING

A. Store miscellaneous metal items above grade on platforms, skids, or other required supports.

B. Protect from damage and from corrosion, dirt, grease and other foreign matter.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Structural Steel Shapes: ASTM A36.

B. Rolled Steel Plates: ASTM A36. Plates to be bent or cold-formed shall conform to ASTM A283, Grade C.

C. Round HSS: ASTM A500 Grade B or C.

D. Square and Rectangular HSS: ASTM A500 Grade B or C.

E. Steel Pipe: ASTM A53 Type E or S, Grade B, standard weight (Schedule 40), unless otherwise noted. Black finish.

F. Steel Sheet: ASTM A1008 or ASTM A1011.

G. Steel Bolts: ASTM A307, Grade A, or F3125 with hex steel nuts per ASTM A563 and washers. Galvanized in accordance with ASTM A153 for exterior locations.

H. Steel Bars: Conforming to ASTM A108 or ASTM A575.

I. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A47, or cast steel, ASTM A27. Provide bolts, washers, and shims, hot-dip galvanized per ASTM A153.

J. Nonshrink, Nonmetallic Grout: Factory-packaged, non-staining, noncorrosive, nongaseous grout complying with ASTM C1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

K. Concrete Materials:

1. Concrete per Section 03 3000, Cast-in-Place Concrete.

2. Welded wire fabric and reinforcing per section 03 2000, Concrete Reinforcing.

2.02 FABRICATION

A. General:

1. Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces. Mark units for reassembly and installation.

2. Cut, drill, and punch metals cleanly and accurately. Ease exposed edges to a radius of approximately 1/32 inch, unless otherwise indicated or specified. Remove sharp and rough areas on exposed surfaces. Form exposed work with accurate angles and surfaces and straight edges. Form exposed connections with hairline joints, flush and smooth. Locate joints where least conspicuous.

B. Welding:

1. Weld connections unless otherwise indicated.

2. Weld corners and seams continuously and in accordance with requirements of AWS D1.1 Structural Welding Code. Welds shall be inspected as required in Section 05 1200: Structural Steel Framing.

3. Grind exposed welds smooth and flush to match and blend with adjoining surfaces.

2.03 PREPARATION FOR GALVANIZING

A. Fabricate to the largest size possible and whenever possible use slip joints to minimize field welding.

B. Fabricate structural steel in accordance with Class I, II, III guidelines as described in AGA's Recommended Details for Galvanized Structures, to facilitate galvanizing process. Corners of gussets, stiffeners, and bracing shall be cropped to allow free flow of zinc during galvanizing process.

C. Remove welding slag, splatter, anti-splatter compounds and burrs prior to delivery for galvanizing.

D. Marking for Identification: Avoid unsuitable marking paints for identification, such as oil based paints and markers and crayon markers. Use water soluble paints or markers acceptable to galvanizer or steel tags wired to the work.

E. Masking: Use masking materials recommended by the American Galvanizers Association (AGA) to produce ungalvanized areas for field welding and at slip critical bolts.

F. Galvanize fabrications per Section 05 5013, Hot-Dip Galvanizing, in accordance with ASTM A123 and ASTM A153.

2.04 SHOP FINISH

A. Metal fabrications shall be provided with a coat of primer, except those indicated to be hot-dip galvanized.

B. Primers:

1. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

2. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.

3. Minimum dry film thickness of primer shall be 2.0 mils.

C. Preparation for Primer Painting: Miscellaneous ferrous metal, except items specified galvanized, shall be thoroughly cleaned and prepared for painting, including removal of shipping oils or protective coatings, mill scale, grease, dirt and rust. Prepare in accordance with SSPC recommendations. Deliver to Project site primed or galvanized as indicated, and ready to receive Project site applied finishes.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine the areas where metal fabrications are to be installed. Notify the OAR in writing of unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.02 INSTALLATION

A. Provide anchorage devices and fasteners as indicated in the drawings and where necessary for securing miscellaneous metal fabrications to in-place construction.

B. Cut, drill, and fit as required for installation of miscellaneous metal fabrications. Set metal fabrication accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

C. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop-welded because of shipping size limitations. Do not weld, cut, or abrade the surfaces of hot-dip galvanized fabrications intended for bolted or screwed field connections.

D. Alignment: Verify alignment of items with adjacent construction. Coordinate related work.

E. Grout: Follow manufacturer's recommendations for substrate preparation and application.

F. Corrosion Protection: Coat concealed surfaces of metals that will come into contact with grout, concrete, masonry, or wood, with a heavy coat of bituminous paint or zinc chromate primer. Protect dissimilar metals from galvanic corrosion by pressure tapes, coating, or isolators.

3.03 FIELD WELDING

A. Preparation of Weld Area of Galvanized Fabrications: Remove masking from fabrications. Remove remaining zinc coating between one inch and four inches from both sides of members to be welded, by grinding back the zinc coating, burning the zinc away or pushing back the molten zinc from the weld area.

B. Welding: Comply with AWS Code for procedures of manual shielded metal-arch welding, appearance and quality of welds made, methods used in correcting welding work.

1. Weld in accordance to AWS D-1.1.

2. Weld galvanized fabrications in accordance to AWS D-19.0.

C. Remove welding flux immediately. At exposed connections, finish exposed welds and surfaces smooth and blended so that no roughness shows after finishing and contour of welded surfaces matches those adjacent.

D. Upon completion of welding plug vent, drainage and lifting holes of galvanized fabrications with appropriate diameter zinc plugs. Push in about half way by hand, and hammer to a tight fit. With a hand file or an abrasive tool, file away excess material. Repair scratches with a zinc rich coating.

1. Plug railing holes.

2. Plug visible holes of HSS members.

3.04 ADJUSTING AND CLEANING

A. Touch Up Damaged Surfaces:

1. Shop Painted Finishes: Comply with SSPC-PA-1 for touch-up; apply with brush to produce a minimum 2.0 mil dry film thickness.

2. Galvanized Surfaces: Clean field welds, connections and damaged areas. Apply two coats of Carbomastic 15, by Carboline or equal product approved by OWNER's OEHS. Brush or roll to a 4 to 6 mil thickness.

3.05 CLEAN UP

A. Remove rubbish, debris, and waste materials and legally dispose of off the Project site.

3.06 PROTECTION

A. Protect the Work of this section until Substantial Completion.

END OF SECTION

SECTION 061000
ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Structural dimension lumber framing.
   2. Exposed timber structural framing.
   3. Rough opening framing for doors, windows, and roof openings.
   4. Concealed wood blocking, nailers, and supports.

1.2 REFERENCE STANDARDS

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.

B. AWPA U1 - Use Category System: User Specification for Treated Wood; 2012.

C. PS 20 - American Softwood Lumber Standard; 2010.

D. SPIB (GR) - Grading Rules; 2014.

E. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2004, and supplements.

F. PS 1 - Structural Plywood; 2009.

1.3 ACTION SUBMITTALS

A. See Section 013000 – Administrative Requirements, for submittal procedures.

1.4 DELIVER, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies. See general structural notes for species and grade requirements.

1. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
1. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

B. Lumber fabricated from old growth timber is not permitted.

2.2 PLYWOOD OR ORIENTED STAND BOARD

A. Each panel shall be identified with the appropriate grade, trademark of the American Plywood association, and shall meet the requirements of the latest edition of the US Product Standard PS-1. Plywood grade shall conform to CD-X for plywood OR type 2-M-W for Oriented Strand Board, unless otherwise noted.

B. Where plywood is permanently exposed to weather, it shall be exterior type. Otherwise, panel sheathing shall be exposure Plywood to be CC grade at locations exposed to weather; CC or CD grade elsewhere.

C. Panels to be 5-ply minimum, except 3/8" panels to be 3-ply minimum.

2.3 ACCESSORIES

A. Fasteners and Anchors:
1. See general structural notes for requirements for metal connectors, anchors, or fasteners in contact with pressure treated wood or fasteners considered exposed to weather. Where required, hot-dipped galvanized steel to comply with ASTM A153/A153M.

B. Sill Gasket on Top of Foundation Wall: 1/4 inch thick, plate width, closed cell plastic foam from continuous rolls.

C. Sill Flashing: As specified in Section 076200.

2.4 FACTORY WOOD TREATMENT

A. Treated Lumber & Plywood: Comply with Requirements of AWPA U1 – Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
1. Provide lumber marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

PART 3 - EXECUTION

3.1 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches and seal.

B. Install sill gasket under sill plate of framed walls bearing on foundations; puncture gasket cleanly to fit tightly around protruding anchor bolts.

C. Coordinate installation of rough carpentry members specified in other sections.

3.2 INSTALLATION – GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.3 FRAMING INSTALLATION

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

3.4 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

3.5 SITE APPLIED WOOD TREATMENT

A. Apply preservative treatment compatible with factory applied treatment at site-sawn cuts, complying with manufacturer's instructions.

B. Allow preservative to dry prior to erecting members.

3.6 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.7 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

END OF SECTION

SECTION 061643
GYPSUM SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Exterior wall sheathing.
   2. Weather resistive barrier under cement plaster.
B. Related Sections:
   1. Section 071300 – Sheet Waterproofing
   2. Section 072600 – Vapor Retarders
   3. Section 072700 – Air Barriers: Flexible Flashing.
   4. Section 075423 – Thermoplastic Polyolefin (TPO) Roofing
   5. Section 076000 – Sheet Metal Flashing and Trim
   6. Section 092400 – Portland Cement Plastering

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data: Provide for exterior sheathing; include historical performance information.

1.3 QUALITY ASSURANCE

A. Certifications: Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements.

1.4 DELIVER, STORAGE, AND HANDLING

A. Comply with Section 016600.
   1. Storage and Protection:
      a. Store products above ground, on platforms or skids, and covered with waterproof coverings.
      b. Store products with ventilation, drainage, and protection against damp or wet locations.

PART 2 - PRODUCTS

2.1 GLASS FIBER FACED GYPSUM SHEATHING

A. Locations: Exterior walls of metal framing.
   1. Glass Fiber Faced Gypsum Sheathing, ASTM C1177.
   2. Thickness: 5/8 inch.
   3. Type X for fire-rated assemblies and locations where indicated; regular type at other assemblies.
   4. Flame spread and smoke developed, when tested in accordance with ASTM E84: 0.
B. Acceptable Products and Manufacturers:
   1. G-P Dens-Glass Gold Exterior Sheathing, Georgia-Pacific Corporation, Atlanta, GA.
   2. e^2XP Extended Exposure Sheathing, National Gypsum, Charlotte, NC.
   3. Securock Glass-Mat Sheathing, USG, Chicago, IL.

2.2 ACCESSORIES

A. Fasteners: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a saltspray resistance of more than 800 hours according to ASTM B117.
B. Fluid Applied Air Barrier: Refer to Section 072700.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.
B. Verify sheathing ends will be supported on framing.
C. Before installation, check members for damage, and proper dimensions.

3.2 INSTALLATION

A. General: Construct plumb, level, true to line, square, and free from warp or twist while maintaining dimensional tolerances and alignment with surrounding construction.
   1. Provide compatible sealant system between sheathing and adjacent construction.
   2. Seal locations necessary to create and secure continuous enclosure even though Drawings may not indicate all locations; do not seal weep holes.
   3. Seal to prevent migration of water, vapor, and air through joints within sheathing and between sheathing and adjacent construction.
B. Glass Fiber Faced Gypsum Sheathing: Erect with edge butted tight and ends occurring over framing member. Space framing members at not more than 16 inches on center.
   1. Secure to steel framing with bugle head steel screws to each support in accordance with manufacturer's recommendations but with fasteners spaced at not more than 8 inches on center vertically.

3.3 PROTECTION

A. Protect finished work in accordance with Section 017300.
B. Protect products from moisture absorption and subsequent warping or deterioration until subsequent construction can proceed.

END OF SECTION

SECTION 062000
FINISHED CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior Finish Carpentry Work:
      a. Field fabricated standing and running trim including but not limited to caps, trim, baseboard and wood flooring transitions and trim.
      b. Wall Panels.

B. Related Sections:
   1. Section 061053 –Rough Carpentry: Blocking, bracing and back-up framing.
   2. Section 092900 - Gypsum Board Assemblies: Metal backup used with metal stud framing.
   3. Section 099000 - Painting and Coating: Field finishing.

1.2 DEFINITIONS

A. Comply with applicable provisions of *Architectural Woodwork Institute* (AWI), latest Edition or *North American Architectural Woodwork Standards* (NAAWS), latest Edition.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data: Provide technical data on wood treatment materials, application instructions, and historical performance information.
C. Shop Drawings:
   1. Indicate profiles, sections, sizes, thicknesses, quantities, markings, materials, wood species, finishes, accessories, and locations of each item.
   2. Include assembly and installation drawings to show methods of wood blocking, fastening, bracing, jointing, and connecting to work of other trades.
   3. Scale: 3/4 inch = 1 foot for full sections, and 3 inches = 1 foot for details.
D. Samples: Provide 2 of each type and species of plywood and finish lumber with applied finish.
E. Certifications: Submit certifications required under Quality Assurance.

1.4 QUALITY ASSURANCE

A. Fabrication and Installation Standards: Fabricate and install in accordance with North American Architectural Woodwork Standards, latest Edition as listed below.
   Lumber grades: NAAWS Section 3.
   1. Millwork, Standing and running trim: NAAWS Section 6.
   2. Door Frames: NAAWS Section 6.
   3. Rails: NAAWS Section 7.
B. Single Source Responsibility:
   1. Obtain wood architectural veneer and solid wood for panelwork, standing and running trim, casework, and wood doors from single source to ensure uniformity in quality, appearance and construction.
   2. Coordinate flitches, color, and grain matching to ensure consistent appearance of wood materials when viewed together within a room, area, or space.
   3. Fabricator is responsible for finishing and installation of wood items.
C. Certifications: Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements.

1.5 FIELD SAMPLES

A. General: Comply with provisions of Section 014500.
B. Sample Installation:

1. Construct 10 feet long by partition height sample as directed.
2. Illustrate edge treatment, joint treatment, applied finish, grain and color matching, and interface with adjacent materials.

1.6 DELIVER, STORAGE, AND HANDLING

A. Deliver, store, handle, and protect products in accordance with Section 016600 and Section 2, of the NAAWS Manual / AWI, Care and Storage.
B. Protect materials from damage, soiling, and deterioration.
C. Do not deliver finish carpentry materials until job site conditions and operations which could damage, soil or deteriorate work are complete.
D. Store products and materials in ventilated, interior locations under constant minimum temperature of 60 degrees F and relative humidity not to exceed 55 percent.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Install interior finish carpentry products only when temperature and humidity conditions have been stabilized and will be maintained.
B. Maintain temperature and moisture conditions as recommended by woodwork fabricator from date of installation through remainder of construction period.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:
   1. Provide materials that comply with requirements of NAAWS/AWI woodworking standard for each type woodwork and quality grade indicated.
   2. Products surfaced four sides, unless noted otherwise.
   3. Finish level: Custom.
   4. General: Provide from an FSC certified source.
   5. Single source for all wood and wood veneer is required for color and grain matching.
B. Lumber:
   1. General: Lumber sizes indicated are nominal unless detailed by specific dimensions of actual size. Minimum material thickness is 3/4 inch actual, unless noted or shown otherwise.
   2. Interior Trim, Softwood Lumber:
      a. Quality Standard: PS 20.
      b. Species: White, ponderosa, or yellow pine.
      c. Refer to Finish List, WB.
   3. Interior Trim, Hardwood Lumber:
      a. Quality Standard: FS MM-L-736C, Type I.
      b. Species: Refer to Finish List, WD.
      c. Grain: Match Architect’s sample.
      d. Match adjacent door and paneling.
      e. Provide trims and baseboard to match wood flooring, WDF
C. Plywood Panels:
   1. Grading Rules Softwood Plywood:
      a. PS-1 or APA PRP-108.
      b. Plywood Grading Agency: Certified by APA.
      c. FSC certified sourcing.
   2. Hardwood Plywood:

a. NAAWS / AWS Premium Grade
b. Provide hardwood plywood meeting HUD-regulated emission limits.
c. Quality Standard: PS 51.
d. Core Material: Fir veneer.
e. Face Veneer: Maple
f. Grain: Select for color and grain match. Match Architect's sample.
g. Thickness: 23/32 inch thickness unless noted or detailed otherwise.
h. Matching: Book match within panels; end match on stacked panels; sequence match adjacent panels. Confirm with Architect prior to fabrication.
i. Prefinish panels in shop.
j. Refer to Section 090000 – Finish List, WD.

3. Panels:
a. Before proceeding with panel work required to be fitted to other construction, obtain measurements as required for accurate fit.
b. Machine and sand panels to comply with NAAWS /AWS requirements.
c. Provide reveals and edge banding as detailed.
d. Assemble in shop in as large units as practicable to minimize field cutting and fitting.
e. Lock-miter corner joints by shop mitering, joining, splining and gluing, in compliance with specified grade.
f. Provide joint pattern as indicated on Drawings and recommended by NAAWS / AWS for that condition.

2.2 ACCESSORIES

A. Wall Adhesive: Solvent release cartridge type, compatible with substrate, capable of achieving durable bond.
B. Adhesives & Sealants: Only use adhesives and sealants in the interior of the building that meet or do not exceed the VOC limits of the requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168 on the interior of the building.
1. Adhesives and sealants shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit, and Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.
a. Fasteners: Size and type to suit application, finish to match hardware.
b. Sealer: Seal backside of wood to prevent warping
2. Benjamin Moore: Sanding Sealer Clear No. 253.
3. Fuller O'Brien: Super Nap Seal and Finish No. 255-04.
4. PPG: Speedhide Alkyd Sanding Sealer, 6-10.
a. Panel Hanger Clips: Manufacturer's standard steel clip.

2.3 FINISH

A. Shop finish work in accordance with NAAWS [AWS] Section 5. No field finishing permitted except for minor retouching.
B. Apply 2 coats of sealer to concealed surfaces.
C. Finish: NAAWS / AWS System 5 Conversion Varnish:
1. Degree of Sheen: Medium rubbed unless otherwise required to match Architect's sample.
D. Refer to Section 099000 for field finishing where scheduled.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.
B. Verify that field measurements are as shown on shop drawings.
C. Verify that mechanical, electrical, and other items affecting work of this Section are in place and ready to receive the work.
D. Verify blocking, bracing, and back-up framing have been installed in accordance with Section 061053 and 092900.

3.2 PREPARATION

A. Prime paint or seal concealed surfaces and items or assemblies which will be in contact with cementitious materials or surfaces.
B. Make field cuts with extreme care to avoid splintering.

3.3 INSTALLATION

A. General: Install work in accordance with Section 017300 and approved shop drawings.
B. Install work in accordance with specified NAAWS /AWI quality standards.
C. Tolerances:
    1. Set and secure materials and components, rigid, plumb, and square.
    2. Maximum offset from true alignment with abutting materials: 1/32 inch unless otherwise specified or required by NAAWS AWI grade.
    3. Maximum Variation from True Position: 1/16 inch unless otherwise specified or required by AWI quality grade.
D. Shim as required using concealed shims.
E. Cut to fit to exact size. Where woodwork abuts other finished work, scribe and cut for accurate fit. Where necessary to fit at site, provide ample allowance for cutting and fitting.
F. Drill pilot holes at corners before making cutouts.
G. Distribute defects in accordance with NAAWS /AWI quality grade.
H. Install trim and molding in unjointed lengths for openings and for runs less than maximum length of lumber available. For longer runs, use only one piece less than maximum length available in straight run.
I. Stagger joints in adjacent members.
J. Cope moldings at returns and miter at corners.
K. Attach woodwork securely in place with uniform joints providing for thermal, moisture, and building movements; blind nail where possible.
L. Use finishing nails where exposed.
M. Sanding/Filling:
    1. Sand work smooth and set exposed nails and screws.
    2. Apply wood filler in exposed nail and screw indentations and leave ready to receive finishes.
    3. On items to receive transparent finishes, use wood filler to matches surrounding surfaces and required for finishes.
N. Secure woodwork to anchors, built-in blocking, or directly attach to substrates.
O. Paneling:
    1. Set and secure horizontal grounds across substrate, rigid, plumb, and square.
    2. Shim as required with concealed shims to ensure straight, flush, plumb and level panel installation.
    3. Install panels in sequence using full width panels in field and adjusting.
    4. Attachment:

a. Provide fabricator's standard concealed fasteners.
b. Provide for thermal and building movements.
c. Blind nail where possible. Use finishing nails where exposed nails are required, set nail heads, and fill.
d. Provide bolts with blind fasteners at fabricator's recommended spacing.
e. Provide concealed panel hanger clips mounting of panels to grounds.

3.4 CLEANING AND PROTECTION

A. Protect carpentry and paneling from marring, defacement, or other damage until final completion.
B. Clean spaces of debris and vacuum and wipe down panelwork. Leave in condition ready for use.

END OF SECTION

SECTION 064116
PLASTIC LAMINATE CLAD WOOD CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
   1. Section 062000 - Finished Carpentry: Wood edge strip.
   2. Section 123663 - Solid Surfacing Fabrications: Countertops CTR.

1.2 DEFINITIONS

A. Comply with applicable provisions of *North American Architectural Woodwork Standards* (NAAWS), Latest Edition
B. HPDL: High pressure decorative laminate (Plastic Laminate or PLAM).
C. Exposed: As used in this Specification Section, "exposed" portions of casework include surfaces visible when doors and drawers are closed, underside of cabinet bottoms higher than 42-inches above finished floor and back face of doors are considered exposed. Visible surfaces in open casework or behind clear doors also are considered exposed.
D. Exposed Interiors: Visible surfaces in open casework or behind clear doors also are considered as exposed interiors.
E. Semi-Exposed: As used in this Specification Section, "semi-exposed" portions of casework include those members behind opaque doors, such as shelves, divisions, interior faces of ends, case backs, drawer sides, backs and bottoms underside of cabinet bottoms between 24-inches and 42-incges and tops of cases 6’-6" or more above finish floor shall be considered semi-exposed.

1.3 PERFORMANCE REQUIREMENTS

A. Wall mounted cabinets: Able to withstand minimum cabinet-to-wall connection load of not less than 60 pounds per linear foot.

1.4 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data: Manufacturers specifications and installation instructions for hardware and accessory items.
C. Shop Drawings:
   1. Submit in accordance with NAAWS Section 1 – Submittals.
   2. Indicate elevations, profiles, sections, and views of casework fabrications at scale large enough to permit checking for design conformity (typically 3/4 inch = 1 foot for full sections, and 3 inch = 1 foot for details).
   3. Show sizes, thicknesses, quantities, markings, materials, finishes, accessories, hardware, and locations of each item.
   4. Include assembly and installation drawings to show methods of wood blocking, fastening, bracing, jointing, and connecting to work of other trades.
   5. Indicate dimensions necessary for fitting casework and adjacent equipment and appliances to fixed planes.
   6. Indicate cut-out locations.
   7. Coordinate mechanical and electrical devices and other items occurring in casework.
   8. Submit shop drawings with Woodwork Institute (WI) Certified Compliance Program label and certificate.
D. Samples:
   1. HPDL: 8-1/2 by 11 inches on panel backing for each color, texture, and pattern; include manufacturer’s name and pattern number.
   2. Exposed and Semi-Exposed Cabinet Hardware: One set of each type and finish.

E. Informational Submittals:
   1. Certifications specified in Quality Assurance article.
   2. Qualification Data: Fabricator's qualification data.

1.5 REFERENCES

A. Woodwork Institute (WI) 916-372-9943.
   1. Certified Compliance Program (CCP)
B. *North American Architectural Woodwork Standards (NAAWS),* Latest Edition, as adopted and published by the Woodwork Institute.

1.6 QUALITY ASSURANCE

A. Single Source Responsibility: Fabricator is responsible for finishing and installation of casework specified in this Section.
B. Fabricator Qualifications: Company specializing in fabrication, finishing, and installation of quality casework having minimum of 5 years documented experience under current legal name.
C. Certifications: Submit fabricator's certification that products furnished for Project meet or exceed specified requirements.
D. Fabrication and Installation Standards: Fabricate and install in accordance with North American Architectural Woodwork Standards, latest Edition as listed below.
   1. Lumber grades: NAAWS Section 3.
   2. Panel products: NAAWS Section 4.
   3. Millwork, Standing and running trim: NAAWS Section 6.
   4. Casework: NAAWS Section 10.
   5. Countertops: NAAWS Section 11.
E. Woodwork Institute (WI) Certification:
   1. Millwork, casework and cabinetwork shall be manufactured in accordance with standards established in the North American Architectural Woodwork Standards, Latest Edition, published jointly by the Woodwork Institute and the Architectural Woodwork Manufacturer's Association of Canada, in grade or grades herein specified or as shown on Drawings.
   2. Before delivery to jobsite, woodwork supplier shall submit Woodwork Institute Certified Compliance Program labels and certificates indicating millwork products being supplied and certifying that products fully meet the requirements of Grade or Grades specified.
   3. Each elevation of casework, each laminated plastic top, and each solid surface top shall bear Woodwork Institute Certified Compliance Label that will be semi-concealed after fabrication.
   4. At completion of installation, woodwork installer shall provide Woodwork Institute Certified Compliance Certificate indicating the products installed, and Certifying that the installation of these products fully meets the requirements of the Grade or Grades specified.
   5. All fees charged by the Woodwork Institute for their Certified Compliance program are responsibility of millwork manufacturer and/or installer and shall be included in their bid.
   6. The foregoing shall not be construed to limit power and authority of Owner to reject any millwork which does not in Owner's opinion meet with any one or more of the specifications of this Contract.

1.7 DELIVER, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600 and NAAWS Section 2 – Site Conditions.
B. Protect materials from damage, soiling, and deterioration during transit and storage.
C. Do not deliver casework materials until Project site conditions and operations which could damage, soil, or deteriorate work are complete.

D. Store products and materials in ventilated, interior locations under constant minimum temperature and relative humidity recommended by casework manufacturer.

1.8 PROJECT CONDITIONS

A. Comply with NAAWS Section 2 – Site Conditions

B. Environmental Requirements: Obtain and maintain temperature and moisture conditions as recommended by casework fabricator for storage and installation, including remainder of construction period.

C. Field Measurements:

1. Field measure conditions where casework is indicated to be fitted to other construction prior to fabricating work of this Section.
2. Show final field measurements on shop drawings.
3. Where field measurements cannot be made without delaying Project, coordinate dimensions among trades to ensure proper fit of casework.

1.9 WARRANTY

A. Comply with provisions of Section 013300.

B. Furnish warranty with provisions for repairing or replacing, at no additional cost to Owner, casework items that exhibit defects in material or workmanship for 2 years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Furnish materials and products in compliance with NAAWS, latest edition.

B. High Pressure Decorative Laminate:

1. Basis of Design: Refer to Materials Finish List and as Indicated on the Drawings.
2. Quality Standard: Comply with NEMA LD-3.
3. Acceptable Products:
   a. Wilsonart
   b. Formica
   c. Laminart
   d. Chemetal
   e. Nevamar
   f. Pionite

C. Plastic Laminate Backing Sheets: High Pressure laminate of paper, without decorative finish, 0.020 inch thick.

D. Melamine:

1. Composition: High Pressure laminate of paper, with decorative finish, 0.020 inch thick.
2. Color: White unless otherwise indicated on Drawings.

E. Wood Base at Toe Kick: Solid hardwood such as Poplar, covered with laminate.

F. Softwood Lumber: Comply with PS 20.

1. Maximum Moisture Content: 6 percent.
2. Species: Douglas fir, hemlock, Ponderosa pine, or Sugar pine.

G. Particleboard:

1. Comply with ANSI A208.1, phenolic resin particleboard.
2. No added urea formaldehyde.
3. General Purpose: Type 1-M-1.
4. Water Resistant: Type 2-M-2 or 2-M-3.

H. Medium Density Fiberboard (MDF): ASTM D1037 and ANSI A208.2, Classification M-3.

1. Formaldehyde free material.
2. Fire retardant treated, Class I or Class A rating.
3. Density: Minimum of 48 PCF.
4. Thickness:
   a. Panel structural components: Minimum 3/4 inch thick.
   b. Back Panels, Drawer Components, and Drawer Bottoms: Minimum 1/2 inch thick.
   c. Fixed Shelves, Dividers, Mounting Stretchers: Minimum 3/4 inch thick.
   d. Semi-exposed Adjustable Shelves in Cabinets under 36 inches Wide: Minimum 3/4 inch thick.
   e. Shelves in Cabinets 36 inches Wide or Greater: Minimum 1 inch thick.
5. Acceptable Product: Medite FR, Medite Corporation, Medford, OR.

I. Hardboard:
1. Grade: Tempered.
2. Face: One face sanded.
3. Thickness: 1/4 inch.

2.2 COMPONENTS

A. Accessibility Guidelines: Operable parts for all accessible casework shall comply with CBC Section 11B-309.

B. Hardware:
1. Drawer Slides:
   a. General: Steel ball-bearing, full extension, soft close feature integrated into slide profile.
      1) Capacity: 100 pound medium duty.
   b. Acceptable Manufacturers:
      1) Accuride, Santa Fe Springs, CA.
      2) Hettich America LP, Alpharetta, GA.
      3) Hafele.
2. Heavy-duty Lateral Drawer Slides:
   a. General: Steel ball-bearing, full extension, soft-close feature integrated into slide profile, 200 pound capacity minimum.
   b. Acceptable Manufacturers:
      1) Accuride.
      2) Hettich America LP.
      3) Hafele.
3. Hinges:
   a. General: Concealed "European" style, 170 degree opening.
   b. Acceptable Manufacturers:
      1) Julius Blum Company, Inc.
      2) Grass America, Inc.
      3) Stanley Hardware.
4. Pulls:
   a. Finish: Clear anodized aluminum.
   b. Acceptable Manufacturers:
      1) EPCO Engineered Products Company.
      2) Stanley Hardware.
      3) Ives, Allegion.
5. Shelf Support Pins:

a. Nickel Steel.
b. Location: 4 per shelf.
c. Acceptable Products and Manufacturers:
1) Hafele 282.04.711.
2) Knape & Vogt 333.

6. Shelf Standards and Supports:
a. General: Steel, surface mounted, adjustable on 1/2 inch centers. Clip type supports.
b. Finish: Color finish selected by Architect.
c. Acceptable Products and Manufacturers:
1) Knape and Vogt Manufacturing.

7. Grommets:
a. General: Minimum 2 inch hole, color as selected by Architect.
b. Acceptable Products and Manufacturers:
1) Doug Mockett and Company, Inc.
2) Hafele America Company.

8. Cantilevered Aluminum Countertop Support:
a. Material: 6063 T-6 “T-shape” extruded aluminum.
b. Finish: Off white powder coat.
c. Thickness: 0.250
d. Counter Depth: To 25-inches.
e. Basis of Design: Rakks EH-Inside Wall Mount Model #EH-1818FM, Rangine Corporation.

2.3 ACCESSORIES AND TREATMENTS

A. Contact Adhesive:
1. Type recommended by casework fabricator to suit application.

B. Adhesives & Sealants: Use adhesives and sealants that comply with VOC limits of the requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168 , Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit, and Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

C. Fasteners: Size and type to suit application.

D. Sealer:
1. Benjamin Moore: Sanding Sealer Clear No. 253.
2. Fuller O'Brien: Super Nap Seal and Finish No. 255-04.
3. Glidden: Ultra-Hide Quick Dry Sanding Sealer No. Y-5035.

2.4 FABRICATION

A. General:
1. Fabricate per applicable section of NAAWS, latest edition.
2. Do not locate joints within 2 foot of sink cut-out.
3. Cap exposed edges with laminate, except where indicated otherwise.
4. Deliver to site in units sized for ease for handling and to permit passage through building openings.
5. Prime unfinished concealed surfaces with sealer. Brush apply only.
6. Provide cutouts for plumbing fixtures, hardware, inserts, appliances, electrical work, and other fixtures. Verify locations of cutouts from site dimensions. Seal or prime paint contact surfaces of cutouts.
7. Route or groove back of flat trim members, kerf backs of other wide flat members except plywood members.

8. Apply laminate finish in full, uninterrupted sheets of maximum practical lengths. Form corners and butt joints with hairline joints. Do not locate joints within 2 feet of sink cut-out.

B. Construction:
   1. Base Cabinets:
      a. Use finished end panels unless condition will be fully concealed.
      b. Provide finished toe space fronts, finished to match cabinet front.
   2. Wall Cabinets:
      a. Provide finished end panels unless condition will be fully concealed.
      b. Provide continuous concealed 1/2 inch by 3 inch anchor cleat at top and bottom behind cabinet back full width of unit. Secure cleat in rabbet over back, then glue and spot pin.
   3. Countertops:
      a. Provide with 2 inch deep face drop edge, faced with high pressure laminate unless noted or shown otherwise.
      b. Provide deck mounted 4 inch high pressure laminate covered splashes typically at countertops unless taller splashes shown or noted.
      c. Provide backer or balance sheet at underside of counter top cores.
      d. At countertop with sink cutouts, use only a 3/4” thick moisture resistant MDF (basis of design: Roseburg MedEx) or 3/4” exterior plywood as counter top core.
   4. Shelving:
      a. 3/4 inch thick up to 36 inch unsupported length.
      b. 1 inch thick for over 36 inch unsupported lengths.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.
B. Verify that in-wall blocking is in place before beginning work.
C. Verify that field measurements are as shown on shop drawings.
D. Verify that mechanical, electrical, and other items affecting work of this section are in place and ready to receive the work.
E. Verify building HVAC systems are operating and temperature and moisture conditions as recommended by woodwork fabricator for installation have been achieved and will remain in effect for remainder of construction period.

3.2 PREPARATION

A. Seal concealed surfaces and items or assemblies which will be in contact with cementitious materials or surfaces.
B. Make field cuts with extreme care to avoid splintering.

3.3 INSTALLATION

A. General:
   1. Install in accordance with Section 017300 and approved shop drawings.
   2. Install work in accordance with specified NAAWS quality standards per applicable Sections 6-12.
   3. Distribute defects allowed in quality grade to best overall advantage when installing Project assembled woodwork items.
   4. Shim as required using concealed shims.
   5. Before making cutouts, drill pilot holes at corners.

6. Tolerances for field assemblies and joined items:
    a. Maximum Variation from True Position: 1/16 inch unless otherwise specified or required by NAAWS grade.
    b. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch unless otherwise specified or required by NAAWS grade.
7. Set and secure casework and components. Use joint fasteners to align and secure adjoining cabinets and countertops. Affix base cabinets to floor.
8. Secure to anchors, built-in blocking, or directly attach to substrates where capable of adequately supporting load. Use toggle bolt type fasteners for wall mounted components. Secure countertops to base cabinets.
9. Install hardware in accordance with manufacturer's recommendations. Adjust and leave in proper working order.Thin-Set Method:

B. Field Fitting:
1. Cut to fit and carefully scribe.
2. Where work abuts other finished surfaces, scribe and cut for accurate fit.
3. Do not use overlay trim pieces to cover joints.

3.4 CLEANING AND PROTECTION

A. Protect casework from marring, defacement, or other damage until final completion.
B. Clean spaces of debris and vacuum and wipe down casework. Leave in condition ready for use.

3.5 SCHEDULES AND CASEWORK ITEMS

A. General:
1. Refer to Drawings for locations and dimensions.
2. Quality Standard: Premium Grade unless noted otherwise.

B. HPDL Cabinets:
1. Fabrication Standard: NAAWS Section 10.
2. Quality Standard: Premium Grade.
3. Core: Particleboard.
4. Hardware: Refer to Drawings.
5. Construction: NAAWS Construction Type A, frameless and cabinet and door interface Style 1, Flush Overlay.

C. Plastic Laminate Countertops:
1. Fabrication Standard: NAAWS Section 11.
2. Provide with 2 inch deep face edge to match countertop unless indicated otherwise.
3. Provide deck mounted 4 inch splashes to match countertop unless indicated otherwise.
4. Core, Tops with Sinks: 3/4-inch thick moisture resistant MDF (basis of design: Roseburg MedEx) or 3/4-inch exterior plywood.

D. Countertop: Solid Surfacing top, refer to Section 123663.

END OF SECTION

SECTION 070850
VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Design requirements and testing for exterior air barrier systems.

B. Related Sections:

1. Section 072700 – Air Barrier.
2. Section 079200 – Joint Sealants.

1.2 PERFORMANCE REQUIREMENTS

A. Air Barrier Characteristics:

1. Continuous, with joints and transitions made air-tight. Services include coordination between trades, proper scheduling and sequencing of work, preconstruction meetings, inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities.
2. Air permeability of air barrier materials not to exceed 0.004 cubic feet per minute per square foot under pressure differential of 0.3 in. water (1.57 psf) when tested in accordance with ASTM E2178.
3. Material and Component Assemblies: Air permeance not to exceed 0.04 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57psf) when tested in accordance with ASTM E1677 or E783.
4. Air Tightness Goal of Entire Building: Air leakage of entire building shall not exceed 0.40 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57psf) when tested according to ASTM E779.
5. Meet ASTM E2357 requirements.
6. Withstand positive and negative combined design wind, fan and stack pressures on envelope without damage or displacement, and transfer load to structure.
7. Air barrier shall not displace adjacent materials under full load.
8. Air barrier shall be joined in airtight and flexible manner to air barrier material of adjacent systems, allowing for relative movement of systems due to thermal and moisture variations and creep.
9. The Contractor shall ensure that the intent of constructing the building enclosure with a continuous air barrier system to control air leakage into, or out of the conditioned space is achieved. The air barrier system shall have the following characteristics:
    a. It must be continuous, with all joints sealed.
    b. It must be structurally supported to withstand positive and negative air pressures applied to the building enclosure.
    c. Connection shall be made between:
        1) Foundation and walls.
        2) Walls and windows or door frames.
        3) Different wall systems.
        4) Walls to flashings.
        5) Wall and roof.
        6) Wall and roof over unconditioned space.
        7) Walls, floor and roof across construction, control and expansion joints.
        8) Walls, floors and roof to utility, pipe and duct penetrations.
10. Air Barrier Penetrations: Penetrations of air barrier and paths of air infiltration / exfiltration shall be made air-tight.
11. Comply with Air Barrier Association of America’s (ABAA’s) definition of a tested system.

B. Requirements include coordination between trades required to provide airtight building enclosure, customized fabrication and installation procedures; not production of standard products.
   1. Continuity of air barrier materials and products with joints. Continuity of enclosure assemblies with joints and transition materials to provide whole building air barrier system.
   2. Refer to Section 072700 for air barrier system materials and accessories.
   3. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.

1.3 RESPONSIBILITIES

A. Contractor Responsibilities:
   1. Contractor shall provide coordination of trades, and sequence of construction to ensure continuity of air barrier system joints, junctures, and transitions between materials and assemblies of materials and products, from substructure to walls to roof.
   2. Provide quality assurance procedures, testing and verification, and test preparation.
   3. Preinstallation Meeting:
      a. Organize preinstallation meetings between trades involved in entire building air barrier system to discuss where each trade responsibility begins and ends.
      b. Include sequence of installation to create air-tight joints, junctures, and transitions between materials, products, and assemblies of products specified in different sections, to be installed by different trades.

B. Inspection Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify inspecting agency sufficiently in advance of operations to permit assignment of personnel.

C. Coordination: Coordinate sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid necessity of removing and replacing construction to accommodate inspections and tests.

PART 2 - PRODUCTS – NOT USED

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Section 017300 - Cutting and Patching.

B. Protect construction exposed by or for quality-control service activities, and protect repaired construction.

C. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

3.2 TEST PREPARATION

A. Two weeks in advance of testing, coordinate pre-testing walk through with testing agency and HVAC subcontractor to discuss pre-test preparation required following Army Corps of Engineers Whole Building Air Leakage Test Protocol and pre-testing preparation.

B. Two working days prior to testing, arrange for all temporary enclosures to be in place for testing agency review and pre-testing to confirm extraneous air leakage paths are sufficiently sealed. Undertake re-sealing or modifications of temporary enclosures to testing agencies satisfaction.

C. Provide temporary enclosures to seal intentional functional openings such as exhaust and relief louvers, grilles, cooktop vents, dryer vents and trash chutes that are not used in test to introduce air, using plastic sheeting and duct tape or similar materials.

D. Fill plumbing traps with water.
E. During Testing:
    1. Prop open all doors (bounded in part by and exterior wall, roof or floor included within test area) for test duration.
    2. Provide testing agency complete, uninterrupted access to entire building for test duration.
    3. Coordinate with fire department to have fire alarm set in test mode.
    4. HVAC systems shall be powered down for test duration.
F. Control access during testing to prevent unauthorized entrance or exit to building.

3.3 TESTING AND INSPECTION

A. Whole Building Air Barrier Leakage Testing: Testing consists of testing completed building and demonstrating that upper 95% confidence interval for air leakage rate of building envelope does not exceed 0.40 cfm/ft2 at pressure differential of 0.3 inch w.g. (1.57 psf) as specified below.
    1. Whole building testing shall be accomplished in accordance with ASTM E779 or approved similar test.
    2. Tests shall be accomplished using either (1) both pressurization and depressurization or (2) pressurization alone, but not depressurization alone ((or depressurization or both)). Building shall not be tested unless it is verified that continuous air barrier is in place and installed without failures in accordance with installation instructions so that repairs to the continuous air barrier, if needed to comply with the required air leakage rate, can be done in a timely manner.
    3. Testing shall be performed by a 3rd party agency hired by the Owner; Contractor is responsible for preparing building for test.
    4. For buildings with excessive air leakage, there is a methodology to determine air leakage pathways: ASTM E1186-03 Standard Practices for Air Leakage Site Detection in Building Envelopes and Air Barrier Systems. Contractor shall repair deficiencies to achieve prescribed leakage rate.

END OF SECTION

SECTION 071300
SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: sheet applied waterproofing at foundation walls.

1.2 RELATED SECTIONS:

1.3 Section 072600 – Vapor Barriers
1.4 Section 075423 – Thermoplastic Polyolefin (TPO) Roofing
1.5 Section 076200 – Sheet Metal Flashing and Trim

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data: Submit product data for materials and accessories.
C. Shop Drawings: Clearly indicate details at expansion joints, penetrations, substrate cracks, control joints, drains, terminations, subdrainage mat system, connections to dissimilar waterproofing materials, and other details not shown on Contract Documents.
D. Samples: Submit 12 by 12 inch samples of sheet membrane, subdrainage mat system, and protection board.
E. Submit following Informational Submittals:
    1. Certifications specified in Quality Assurance article.
    2. Qualification Data: Applicator's qualification data.
    3. Manufacturer's instructions; include applicable temperature ranges.
    4. Manufacturer’s Field Reports: Written results and findings of manufacturer’s field services specified as part of Field Quality Control.
F. Closeout Submittals:
    1. Submit under provisions of Section 017700.
    2. Warranty: Submit specified warranty.

1.4 QUALITY ASSURANCE

A. Manufacturer’s Qualifications:
    1. Not less than 5 years documented experience in manufacturing of specified waterproofing.
    2. Obtain primary waterproofing materials from single manufacturer. Manufacturer’s name shall appear on containers.
    3. Provide secondary materials as required by manufacturer of primary materials.
    4. Manufacturer’s qualified technical representative will be required to visit Project site to advise applicator of procedures and precautions for installation of waterproofing materials.
    5. Manufacturer’s technical representative will be required to be at Project site weekly during installation and immediately prior to installation of protection board, and subdrainage mat system to ensure waterproofing has been properly installed and warranty requirements have been met.
B. Applicator Qualifications:
    1. Acceptable to membrane manufacturer prior to execution of this Contract.
    2. Company specializing in application of specified waterproofing.
    3. Minimum 3 years documented experience with submitted product.
C. Owner reserves right to hire independent waterproofing consultant to review submittals, procedures, and installation.

PRODUCT DATA SHEET 1 - Certifications:

1. Submit manufacturer's certification stating materials ordered and supplied are compatible with each other, suited for locale and purpose intended and shipped in sufficient quantity to ensure proper timely installation.
2. Certification shall also state that waterproofing materials have express warranty of fitness for the particular purposes of this Project.
3. Certify materials shipped to Project site meet membrane manufacturer's published performance standards and requirements of this Specification.

1.5 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119.
B. Agenda:
   1. Review Project Specifications and Drawings.
   2. Establish installation schedules and sequence.
   3. Coordinate work with in-place and subsequent construction.
   4. Review weather and working conditions.
   5. Review installation procedures, including:
      Substrate requirements for Project acceptance (curing of concrete surface, form release agents, temperature).
      Waterproofing installation.
      Phasing and sequencing requirements.
      Termination, flashing, expansion joint, and penetration requirements.
      Review inspection, testing, and quality control procedures.
      Review protection requirements for construction period beyond waterproofing installation.
C. Conduct tour of areas to be waterproofed and report on surface acceptance, possible problem areas, and recommended remedies.

1.6 DELIVER, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.
B. Do not double stack membrane pallets.
C. Keep primer, mastics and adhesives in dry area away from flames, sparks and excessive heat.
D. Store material in dry area out of direct sunlight.
E. Cover materials and allow for adequate ventilation.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Do not apply products when surface or ambient temperature is below 40 degrees F, unless special low temperature products are used.
   2. Do not apply products in any instances where surface temperature is lower than 25 degrees F.
   3. Do not apply to damp or frozen surfaces or during inclement weather.
B. Do not work or walk on exposed waterproofing membrane. Install permanent protection board immediately to protect membrane during subsequent work operations.

1.8 SEQUENCING

A. Coordinate and sequence work to ensure that construction materials placed against or over waterproofing and protection system will occur within 7 days of membrane installation. Do not expose membrane to ultraviolet rays beyond period of time recommended by system manufacturer.
B. Install protection board within 24 hours of membrane installation.

1.9 WARRANTY

A. Comply with requirements of Section 013300.
B. Provide warranty for full replacement value of completed installation signed by manufacturer, applicator and Contractor warranting against water infiltration and defects of materials and workmanship for period of 5 years from date of Substantial Completion. If manufacturer will not allow installer and Contractor to sign manufacturer's warranty, append installer and Contractor's warranty to manufacturer's warranty to create warranty that covers labor and workmanship, including labor for access to waterproofing, for watertight warranty.
C. Warrant penetrations, terminations, sealants, expansion joints, membrane, and protection board.
D. Warranty shall include removing and reinstalling superimposed work covering waterproofing.

PART 2 - PRODUCTS

2.1 PRODUCTS AND MANUFACTURERS

A. Acceptable Products and Manufacturers:
    1. Basis of Design: Bituthene 4000 Waterproofing System, GCP Applied Technologies, Cambridge, MA.
    2. MEL-ROL or MEL-GARD, W. R. Meadows, Inc.
    3. CCW MiraDRI 860, Carlisle Coatings and Waterproofing.
    4. Blueskin WP 200, Henry Company.
    5. Polyguard No. 650 Membrane, Polyguard Products, Inc.
    6. Or equal.

2.2 MATERIALS

A. Sheet Membrane:
    1. Type:
        Self-adhering membrane of rubberized asphalt laminated to polyethylene sheet or heavy duty protection course.
        Low temperature grade when dictated by temperature at time of application.
        Compatible with water based primer.
    2. Thickness: 60 mils min.
    3. Color: Manufacturer's standard.
    4. Tensile Strength (Membrane): 250 psi minimum, ASTM D412.
    5. Ultimate Elongation: 300 percent minimum, ASTM D412.
    6. Pliability Temperature: Minus 25 degrees F, ASTM D146.
    7. Hydrostatic Head Resistance at Lap: 150'-0" minimum.
    8. Water Absorption: 0.5 percent maximum weight gain after 48 hour immersion at 70 degrees F, ASTM D570.
B. Primer/Conditioner: Water-based VOC compliant type required by membrane manufacturer. No solvent or 1,1,1 - Trichloroethane based primers will be accepted.
C. Use primer/sealers with VOC limits to comply with Cal-GREEN Table 5.504.4.3 for VOC Content Limits for Architectural Coatings.
D. Mastic: Rubberized asphaltic type required by membrane manufacturer.
E. Liquid Membrane: Single or two-component elastomeric, mastic grade as furnished by membrane manufacturer. Two component urethane type required for use at planters and horizontal membrane applications.
F. Cement Mortar: Epoxy or latex modified cementitious composition acceptable to membrane manufacturer.

G. Concrete Patching Compound: Fast setting, non-shrinking patching compound, of type acceptable to membrane manufacturer.
H. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers.
I. Penetration Seals:
    1. "Link Seal" rubber gasket as approved by membrane manufacturer and included in warranty.
    2. Two-component urethane sealant approved by waterproofing manufacturer.
J. Fan-Fold Protection Board (Vertical Applications):
    1. Type: Extruded polystyrene sandwiched between non-perforated film laminates designed for use in commercial foundation waterproofing applications; 15 psi compressive strength.
    2. Thickness: 1/4 inch.
    3. Acceptable Product:
        GreenGuard-PB4 Protection Board, PacTiv Building Products Company.
        Dow Protection Board III, The Dow Chemical Company.
        UCI Underlayment Board, Owens Corning Foamular.
        Or equal.
K. Protection Board Adhesive: Type required by board manufacturer and compatible with membrane.
L. Subsurface Drainage Mat - Vertical Type:
    1. Vertical grade drainage mat consisting of polyester or polypropylene geotextile fabric bonded to compression-resistant three-dimensional, non-biodegradable, single-sided, sheet polymeric core construction designed to effectively conduct water to foundation drainage system.
    2. Film on rear side of core when drainage mat is used directly over waterproofing.
    3. Thickness: 3/8 inches minimum.
    4. Compressive Strength: 15,000 lbf/ft^2 minimum, ASTM D1621.
    5. Flow rate: 15 gallons per minute per lineal foot of width at 3,600 lbf/ft^2 compression.
    6. Filter Fabric: Refer to paragraph above.
    7. Accessories: As necessary or recommended by drainage mat manufacturer for complete installation.
    8. Acceptable Products:
        Hydroduct 220, Grace Construction Products, Cambridge, MA.
        DB350 Prefabricated Drainage Composites, Henry Company, El Segundo, CA.
        CCW Miradrain 6000, Carlisle Coatings and Waterproofing, Wylie, TX.
        Hydrodrain 400, American Hydrotech, Chicago, IL.
        Or equal.
M. Cover Sheet: 4 mil polyethylene film.
N. Drainage Collection Panel: Provide waterproofing manufacturer's high profile drainage section for use at bottom of wall in lieu of perforated drain pipe.
    1. Provide transition to section to couple drainage section to drainage panel.
    2. Drainage section accepts high flows from surrounding soils and from drainage panel.
    3. Flow rate of 100 gallons per minute.
    4. Provide factory fabricated transition pieces and corners.
    5. Acceptable Products:
        Hydroduct Coil 600 by WR Grace, Cambridge, MA.
        Ameridrain Total-Drain, American Wick Drain Corporation, Matthews, NC.
        CCW-QuickDRAIN, Carlisle Coatings and Waterproofing, Wylie, TX.
        Or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.
B. Ensure surfaces are reasonably smooth and free of holes, cracks or projections which might be detrimental to successful installation.
C. Verify that curing methods used for concrete are compatible with membrane system.
D. Verify that items penetrating waterproofing system are securely installed.
E. Verify that concrete surfaces have cured a period of time acceptable to membrane manufacturer.
F. Verify that masonry joints are struck flush with face of unit.

3.2 PREPARATION

A. Protect adjacent surfaces not designated to receive waterproofing.
B. Clean and prepare surfaces in accordance with manufacturer's instructions.
C. Seal cracks and joints in accordance with manufacturer's instructions. Use proper depth-width ratio required by sealant manufacturer.
D. Remove sharp projections, fins, and loose material. Remove form ties to 3/4 inch minimum behind face of wall. Fill holes, voids, and honeycomb areas flush with concrete patching compound or cement mortar.
E. Seal penetrations with liquid membrane.
F. Provide fillet or cant at junction of vertical and horizontal surfaces using cast-in-place cement mortar in configuration acceptable to membrane manufacturer.

3.3 INSTALLATION

A. Install in accordance with Section 017300 and, approved shop drawings.
B. Apply primer/conditioner at rate required by manufacturer. Install only as much primer/conditioner as can be covered in same day.
C. Prior to placing full membrane, provide membrane strips at inside corners, outside corners, and working joints. Center strips along axis of corner and joint.
D. Extend membrane over footing and down face 6 inches minimum, except terminate at point 12 inches below floor slab of protected space where footings are at greater depth.
E. Install membrane in shingle fashion with edges and ends overlapped at 3-1/2 inches, unless greater dimensions required by manufacturer.
F. Remove release paper layer. Roll out laps and surface with mechanical roller to encourage full contact bond.
G. Completely bond membrane to substrate, except those areas directly over or within 3 inches of working cracks or expansion joints.
H. Place uniform bead of mastic to membrane joint laps. Use liquid membrane at terminations.
I. Seal perimeter ends and edges to adjoining surfaces.
J. Securely fasten top termination of membrane with continuous metal termination bar anchored into substrate and cover with detailing tape.
K. Seal items penetrating membrane with "Link Seal" rubber gasket, two-component urethane sealant, flashing membrane material and liquid membrane. After setting of link seal, apply urethane sealant on exterior to create smooth transition. Apply liquid membrane over gasket and sealant assembly. Install waterproofing and flashing membranes over and around penetrating member. Ensuring positive watertight seal with membrane and penetrating member.
L. Protection Board:
    1. Install separate protection board system over membrane and retain in place in accordance with manufacturer's instructions.

2. Install in single layer with tight butt joints.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Field Services:
   1. Comply with requirements of Section 014500.
   2. Notify manufacturer prior to start of Work and make arrangements for manufacturer's technical representative to be present during first day's work to verify work is being conducted in accordance with their requirements.
   3. Submit summary report; include Project site observations, instructions and monitoring activities.

3.5 PROTECTION AND CLEANING

A. Protect finished work in accordance with Section 017300.
B. Protect adjacent surfaces from damages and stains. Clean materials from surfaces where inadvertently applied.

END OF SECTION

SECTION 072100
THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Batt Insulation
   2. Rigid Insulation

B. Related Sections:
   1. Section 072700 – Air Barriers
   2. Section 075423 – Thermoplastic Polyolefin (TPO) Roofing.
   3. Section 078400 – Firestopping
   4. Section 092900 – Gypsum Board Assemblies

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data: Submit product data for each product.
C. Submit following Informational Submittals: Manufacturer's instructions.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Furnish each insulation type from one manufacturer for entire Project, unless otherwise acceptable to Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.
B. Identify products with appropriate markings of applicable testing and inspecting organization.
C. Storage and Protection:
   1. Store materials raised off floor or ground and under cover to keep dry.
   2. Protected from weather, direct sun light, contamination, sources of ignition, and damage from construction operations.

1.5 SEQUENCING

A. Sequence work.
B. Do not begin work until substrate work is complete and work of other trades which will be concealed by work of this section have been approved.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fiberglass Insulation – General Requirements:
   1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.
   2. Use formaldehyde free materials where available.

B. Fiberglass Mineral Wool Batt Insulation - Unfaced
   1. General:
      a. Glass fiber composition, friction fit type, unfaced.
      b. Thermal resistance "R" values as indicated.
   2. Classification: ASTM C665, Type I.
   3. Thermal resistance: ASTM C518, "R" value of 3.2 per inch of thickness at 75 degrees F mean temperature.
   4. Fire rating: ASTM E84, Flame spread 25 or less and smoke development 50 or less.
   5. Acceptable Products:
      a. Basis of Design: EcoTouch Fiberglass Insulation, Owens Corning.
      b. Unfaced Building Insulation, CertainTeed.

c. Unfaced Thermal-SHIELD, Johns Manville Corporation.

C. Sheet Vapor Retarder:
1. Polyamide film, 2 mil thick with maximum permeance rating of 1 perm or less in accordance with ASTM E96, Standard Desiccant method.
2. Acceptable Product: MemBrain Smart Vapor Retarder, Certaineed.
3. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

D. Extruded Polystyrene Board Insulation:
1. General:
2. Not manufactured using chlorofluorocarbons (CFCs) and maximize use of recycled material.
3. Square edges.
4. Thermal resistance "R" value: 5 per inch
5. Thickness: As indicated.
6. Located on exterior side of air/weather barrier; behind façade cladding.
7. Classification: ASTM C578, Type IV (25 PSI)
8. Acceptable Manufacturers:
a. Foamular CW25 by Owens Corning Foamular.
b. GreenGuard XPS Type IV 25 PSI by Kingspan.
c. Styrofoam Cavity Mate by The Dow Chemical Company.

2.2 ACCESSORIES

A. Insulation Fasteners: Impale clip type with retaining disc or plate, galvanized steel, adhered or mechanically fastened to surface to receive insulation, length to suit insulation thickness, capable of securely fastening insulation in place.

B. Tape: Self-adhering pressure sensitive, compatible with insulation, foil type recommended by manufacturer of insulation.
1. Fire Rating: ASTM E84, flame spread 25 or less and smoke developed of 50 or less.

C. Select adhesives, primers and sealants meeting Cal-GREEN requirements.
1. Adhesives shall meet or exceed the VOC and chemical component limits of Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit requirements.
2. Sealants and Sealant Primers shall meet or exceed the VOC and chemical component limits of Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.

B. Verify that work of other trades which will be covered by insulation is complete, approved, and tested.

3.2 INSTALLATION

A. General: Comply with Section 017300.

B. Batt Installation:
1. Install insulation after plumbing, mechanical, and electrical services have been installed.
2. Provide mechanical fasteners, wire mesh, or other accessories to ensure insulation remains in specified position.
3. Fit insulation tight within spaces and tight to exterior side of plumbing, mechanical, and electric services within plane of insulation leaving no gaps or voids.
4. Butt insulation tightly.
5. Cut and fit tightly around items penetrating insulation.
6. Stagger butt joints.

7. Use batts free of damage.
8. Install insulation within metal framing systems full height and width. Do not allow voids or openings to occur. Insulation is required for full width between studs, including cavity of each stud.
9. Cut and trim insulation neatly, to fit spaces.
10. Cut insulation oversize to ensure tight butt joints when installed. Cut insulation to fit around protrusions and irregularly shaped projections.

C. Cavity Wall Insulation:
1. Follow manufacturer's instructions for conditions encountered.
2. Secure insulation with adhesive.
3. Stagger joints between courses.
4. Place boards in method to maximize contact bedding.
5. Butt edges and ends tight to adjacent board and to protrusions.
6. Cut and shape insulation with knife, handsaw, or other cutting tool as required to fit around penetrations, projections, and openings to accommodate conduit or other services.
7. Seal cut-outs with manufacturer's recommended sealant.

D. Sheet Vapor Retarder: Place in accordance with manufacturer's requirements and recommendations.

3.3 PROTECTION

A. Protect finished work from damage due to construction operations.
B. Protect insulation from moisture until building is made watertight.

END OF SECTION

SECTION 072600
VAPOR RETARDERS

PART 1 - GENERAL

1.1 SUMMARY

A. Vapor retarders for use below slabs-on-grade, at exterior facades.

B. Related Sections:

1. Section 061643 – Gypsum Sheathing
2. Section 071300 – Sheet Waterproofing
3. Section 072700 – Air Barrier
4. Section 075423 – Thermoplastic Polyolefin (TPO) Roofing.
5. Section 076000 – Flashing and Sheet metal
6. Section 079200 – Joint Sealants.

1.2 DEFINITIONS

A. Perm: 1 grain/h•ft^2•in-Hg.

1.3 SUBMITTALS

A. General: Submit following items in accordance with Section 013300.

B. Product Data: Submit product data for each product, including tape.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

1.5 SEQUENCING

A. Begin installation only after substrate work is complete and penetrations are securely anchored.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Class A Vapor Barrier (15 mil):

1. Provide materials tested for use under slab-on-grade and successfully passing ASTM E154, Sections 8, 11, 12, and 13.
   a. Material shall conform to the requirements under the following conditions: when tested in accordance with
      1) Test Methods ASTM E154, Section 7 (based on Test Methods ASTM E96/E96M), or Test Method ASTM F1249, test temperature shall be 73.4°F (23°C) and test humidity shall be 50 +/- 2 %.
      2) 7.1.1 Permeance of New Material—No conditioning.
      3) 7.1.2 Permeance after Wetting, Drying, and Soaking—Refer to Test Methods ASTM E154, Section 8.
      4) 7.1.3 Permeance after Heat Conditioning—Refer to Test Methods ASTM E154, Section 11.
      5) 7.1.4 Permeance after Low Temperature Conditioning—Refer to Test Methods ASTM E154, Section 12.
      6) 7.1.5 Permeance after Soil Organism Exposure—Refer to Test Methods ASTM E154, Section 13.
2. Virgin waterproof metallocene polyolefin film; recycled materials not allowed.
3. Comply with ASTM E1745, Class A minimum.
4. Tensile Strength: 45 pound/inch minimum, ASTM E154, Section 9.
5. Permeance: ASTM E1745, Section 7.1: 0.01 perms maximum.
6. Puncture Resistance: 2200 grams minimum, ASTM D1709, Method B
7. Acceptable Product:
   a. Basis of Design: Stego Wrap15 mil Class A, Stego Industries, LLC.

b. Ecoshield E15 by Epro.
c. Vaporguard by Reef Industries.
d. Or equal.

B. Joint Tape and Edge Seals: Manufacturer's recommended, pressure sensitive type, self adhering, and of perm rating not less than vapor retarder.
C. Pipe Boots: Construct pipe boots from vapor barrier material and pressure sensitive tape per manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017300.
B. Verify that substrate work is complete, clean and dry before beginning installation of sheet products.

3.2 INSTALLATION

A. Under Slab-on-Grade:
1. Install vapor retarder in accordance with manufacturer's written instructions, ACI publication 302 "Guide for Concrete Floor and Slab Construction", and ASTM E1643.
2. Lay-out sheets to minimize quantity of joints. Lap edge and end joints 12 inches minimum and continuously seal with joint tape. Lay sealant bead or double stick tape between layers that overlap.
3. Seal penetrations, including pipes, with manufacturer's pipe boot. Seal around pipes, plumbing risers, electrical conduit, other slab penetrations.
4. Turn up sheets 12 inches at perimeter; at footers and vertical walls, and against penetrations. Seal joints and terminations with tape. Cut off excess material after concrete has been installed and reviewed by the Architect.

B. Installation of vapor retarders on framing
1. Extend vapor retarders to extremities of areas to protect from vapor transmission. Secure vapor retarders in place with adhesives, vapor retarder fasteners, or other anchorage system as recommended by manufacturer. Extend vapor retarders to cover miscellaneous voids in insulated substrates, including those filled with loose-fiber insulation.
2. Seal vertical joints in vapor retarders over framing by lapping no fewer than two studs and sealing with vapor-retarder tape according to vapor-retarder manufacturer's written instructions. Locate all joints over framing members or other solid substrates.
3. Seal joints caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor-retarder tape to create an airtight seal between penetrating objects and vapor retarders.
4. Repair tears or punctures in vapor retarders immediately before concealment by other work. Cover with vapor-retarder tape or another layer of vapor retarders.

3.3 PROTECTION

A. Protect sheets from puncture during installation. Patch punctures before proceeding with subsequent construction.
B. Install runway planks in construction traffic lanes until slabs are poured.
C. Patches: Lay patch over damaged areas and seal around patch using same method described above for overlapping sheets.

END OF SECTION

SECTION 072700
AIR BARRIER

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid applied air barrier for use over exterior wall sheathing substrates and transition material, and metal faced penetration membrane material between dissimilar substrates.

B. Performance Requirements: Refer to Section 070850 Air Barrier Performance Requirements.

A. Related Sections:

1. Section 061643 – Gypsum Sheathing.
2. Section 070850 – Air Barrier Systems Performance Requirements.
3. Section 071300 – Sheet Waterproofing
4. Section 072100 – Thermal Insulation.
5. Section 072600 – Vapor Retarders
6. Section 075423 – Thermoplastic Polyolefin (TPO) Roofing.
7. Section 076000 – Flashing and Sheet metal
8. Section 079200 – Joint Sealants.

1.2 DEFINITIONS

A. Perm: 1 grain/h•ft^2•in-Hg.

1.3 PERFORMANCE REQUIREMENTS

A. Provide a fluid applied, vapor permeable, ultraviolet resistant at open joint conditions, NFPA 285 rated air barrier system constructed to perform as a continuous air barrier, and as a liquid water drainage plane flashed to discharge to exterior any incidental condensation or water penetration.

B. Membrane shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air seal materials at such locations, changes in substrate and perimeter conditions.

C. Air Barrier Characteristics:

1. Continuous, with joints and transitions made air-tight.
2. Air permeability not to exceed 0.004 cubic feet per minute per square foot under pressure differential of 0.3 in. water (1.57 psf) when tested in accordance with ASTM E2178.
3. Meet ASTM E2357 requirements.
4. Withstand positive and negative combined design wind, fan and stack pressures on envelope without damage or displacement, and transfer load to structure.
5. Air barrier shall not displace adjacent materials under full load.
6. Air barrier shall be joined in airtight and flexible manner to air barrier material of adjacent systems, allowing for relative movement of systems due to thermal and moisture variations and creep.
7. Connection shall be made between:

Foundation and walls.
Walls and windows or door frames.
Different wall systems.
Walls to flashings.
Wall and roof.
Wall and roof over unconditioned space.
Walls, floor and roof across construction, control and expansion joints.
Walls, floors and roof to utility, pipe and duct penetrations.

8. Air Barrier Penetrations: Penetrations of air barrier and paths of air infiltration / exfiltration shall be made air-tight.
9. Comply with Air Barrier Association of America’s (ABAA’s) definition of a tested system.

1.4 SUBMITTALS

A. General: Submit following items in accordance with Section 013300.
B. Product Data:
    1. Submit product data for each product including membrane, primers, sealants, adhesives, and auxiliary materials.
    2. Include manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature and other limitations of installation conditions, technical data, and tested physical and performance properties.
    3. Provide test results of specified system using ASTM E2357.
    4. Show NFPA 285 rating for assembly.
        a. Shop Drawings: Show locations and extent of air barrier and details of all typical conditions, intersections with other envelope systems and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated and how miscellaneous penetrations such as conduits, pipes electric boxes and the like are sealed.
        b. Samples: Provide sample of product applied to the following substrates:
    5. Exterior gypsum sheathing.
        a. Submit following Informational Submittals:
    6. Certifications specified in Quality Assurance article.
    7. Installer qualifications.
    8. Manufacturer's instructions.
        a. Closeout Submittals:
    9. Submit under provisions of Section 017700.
    10. Warranty: Submit specified warranty.

1.5 QUALITY ASSURANCE

A. Single-Source Responsibility:
    1. Obtain air barrier materials from a single manufacturer regularly engaged in manufacturing the product.
    2. Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).
B. Manufacturer Qualifications: Manufactures materials licensed and certified by Air Barrier Association of America’s (ABAA’s) Quality Assurance Program.
C. Installer Qualifications:
    1. Certified in writing by system manufacturer as qualified for specified systems.
D. Field Quality Assurance: Implement the ABAA Quality Assurance Program requirements. Cooperate with ABAA inspectors and independent testing and inspection agencies engaged by the Owner. Do not cover air barrier until it has been inspected, tested and accepted.
E. Certifications:
    1. Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements.
    2. Submit manufacturer's certification stating that installed system is in compliance with specified requirements.
    3. Certification by air barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).
    4. Certification of compatibility by air barrier manufacturer, listing all materials on the project that it connects to or that come in contact with it.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

1.5 MOCK-UPS

A. Construct mock-up in accordance with Drawings and Section 014500.
B. Include mock-up of product on exterior gypsum sheathing substrates.
    1. Build mock-up representative of primary exterior wall assemblies and glazing assemblies including backup wall and typical penetrations as acceptable to the Architect. Mock-up shall be approximately 8 feet long by 8 feet high and include the materials proposed for use in the exterior wall assembly. Mock-up shall be suitable for testing as specified in the following paragraph.
    2. Mock-Up Tests for Air and Water Infiltration: Test mock-up for air and water infiltration in accordance with ASTM E1186 (air leakage location) or ASTM E783 (air leakage quantification), and ASTM E1105 (water penetration). Use smoke tracer to locate sources of air leakage. If deficiencies are found, repair or modify mock-up and retest until satisfactory results are obtained. Deficiencies include air leakage beyond values specified, uncontrolled water leakage, unsatisfactory workmanship.
        a. Perform the air leakage tests and water penetration test of mock-up prior to installation of cladding and trim but after installation of all fasteners for cladding and trim and after installation of other penetrating elements. For fasteners which would normally only be installed with cladding, install representative fasteners without cladding; intent is to perform testing with all types of penetrations in place.
    3. Mock-Up Tests for Adhesion: Test mock-up of fluid-applied and sheet applied materials for adhesion in accordance with ASTM D4541 using a Type 1 pull tester except that the disk used shall be 100mm in diameter and the membrane shall be cut through to separate the material attached to the disk from the surrounding material. Perform test after curing period recommended by the manufacturer. Record mode of failure and area which failed in accordance with ASTM D4541. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report shall indicate whether this requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product/substrate combination, then the inspector shall simply record the value.

1.6 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119.
B. Agenda:
    1. Review Project Specifications and Drawings.
    2. Establish installation schedules and sequence.
    3. Coordinate work with in-place and subsequent construction.
    4. Review weather and working conditions.
    5. Review installation procedures, including:
        a. Substrate requirements for Project acceptance (curing of concrete surface, form release agents, temperature).
        b. Material installation.
        c. Phasing and sequencing requirements.
        d. Termination, flashing, expansion joint, and penetration requirements.
C. Conduct tour of areas to receive air barriers and report on surface acceptance, possible problem areas, and recommended remedies.
D. Submit written report to Architect within 3 days of meeting.

1.7 SEQUENCING

A. Begin installation only after substrate work is complete and penetrations are securely anchored.

1.8 PROJECT CONDITIONS

A. Environmental Conditions: Apply air barrier within range of ambient and substrate temperatures recommended by air barrier manufacturer. Do not apply air barrier to a damp or wet substrate, unless the manufacturer specifically permits that for the product.
   1. Do not apply air barrier in snow, rain, fog, or mist.
   2. Do not apply air barrier when the temperature of substrate surfaces and surrounding air temperatures are below those recommended by the manufacturer.

1.9 WARRANTY

A. Comply with requirements of Section 013300.
B. Provide manufacturers warranty for period of 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Fluid Applied Vapor Permeable Air Barriers:
   1. One component, rubberized (elastomeric), fluid applied material.
   2. Color: Manufacturer's standard.
   3. Compatible with extruded polystyrene insulation adhesive in cavity wall construction.
   4. Performance Characteristics:
      a. Solids by Weight: 50 percent minimum.
      b. Water Vapor Permeance: 11 perms minimum, ASTM E96.
      c. Elongation: ASTM D412, 150 percent minimum.
      d. Peel Strength: ASTM C836, 10 lbf/inch minimum.
   5. Air Permeability:
      a. 75 Pa air pressure: 0.00051 L/s.m^2.
      b. 250 Pa air pressure: 0.00071 L/s.m^2.
      c. 300 Pa air pressure: 0.00075 L/s.m^2.
   6. Nail Sealability (ASTM 1970): Pass
   7. VOC Content: Less than 100 g/L.
   8. Basis of Design Product:
      a. Basis of Design: Perm-A-Barrier VPL, GCP Applied Technologies.
      b. Air-Bloc 31MR, Henry Company.
      c. Air-Shield LMP, WR Meadows.
      d. Or equal.
      e. Location: Use as an air barrier on plywood and gypsum sheathing substrates.
B. Use coatings with VOC limits of less than 100 g/L to comply with Cal-GREEN Table 5.504.4.3 for VOC Content Limits for Architectural Coatings.
C. Transition Membrane and Flexible Flashing:
   1. Self-adhering membrane consisting of an SBS rubberized asphalt compound, integrally laminated to polyethylene film.
   2. Thickness: 40 mils.
   3. Performance Characteristics:
      a. Tensile Strength: ASTM D412 modified, 400 psi minimum.
      b. Minimum Puncture Resistance: ASTM E154, 40 lbf.
      c. Elongation: ASTM D412, 200 percent.
   4. Compatible with fluid applied air/vapor barrier.

5. Transition Primer: As recommended by manufacturer for compatibility with transition membrane.
6. Basis of Design Product:
    a. Blueskin SA, Henry Co.
    b. Air-Shield, W.R. Meadows
    c. Perm-A-Barrier Detail Membrane, GCP Applied Technologies.
    d. ExoAir 110 Self-Adhered Air & Vapor Membrane, Tremco
    e. Or equal.

D. Metal Faced Window and Door Penetration Membrane:
1. Substrate compatible for airtight sealant between air barrier and door or window frame.
2. HE200AM Metal Clad as manufactured by Henry or compatible as equal approved by selected manufacturer, a self-adhesive composite membrane of rubberized asphalt and dual-layers of high strength polyethylene with surface layer of metallic aluminum film having the following physical properties:
    a. Aluminum surfacing offers ideal substrate for adhesion of construction sealants
    b. UV and weather resistance due to metallic aluminum surfacing
    c. Excellent adhesion to primed surfaces
    d. Compatible with other components
    e. Flexible for ease of penetration detailing
    f. 100% solids - No VOC's

E. Transition Tape for joining Air Barrier to PVC Roofing: EternaBond MicroSealant tape or equal.

F. Primers: As required by air barrier system manufacturer for optimum adhesion of barrier and membranes to Project substrates.
1. Use primers, sealers and undercoaters with VOC limits of less than 100 g/L to comply with Cal-GREEN Table 5.504.4.3 for VOC Content Limits for Architectural Coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017300.

B. Verify that substrate work is complete, clean and dry before beginning installation of air barrier materials.
1. Do not proceed with installation until after minimum curing period recommended by air barrier manufacturer.
2. Ensure that:
    a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants.
    b. Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
    c. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
3. Verify substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D4263.

3.2 PREPARATION

A. Fluid Applied Air Barriers:

B. Remove rough or sharp projections, loose particles, and foreign matter detrimental to adhesion and application of fluid applied air barriers.

C. Clean and prepare surfaces to receive air barriers in accordance with manufacturer's instructions.

D. Seal penetrations and cracks, and reinforce changes in substrate and other areas as recommended by manufacturer.
E. Apply manufacturer's recommended primer when required for substrate application.
F. Fill voids as recommended by manufacturer.
    1. Joint and Crack Treatment:
G. Fill joints between panels of glass fiber gypsum sheathing up to 1/4 inch wide with trowel application of air barrier material and reinforce with a strip of 2 inch wide glass fiber tape prior to application of liquid membrane. Joints between panels of glass fiber gypsum sheathing wider than 1/4 inch should be sealed with transition membrane adhered to the substrate.
H. Surfaces should be tied in with beams, columns, window and doorframes, etc.; using strips of transition membrane lapped a minimum of 3 inches on both substrates. Mechanical attachment should be made to all window and doorframes, or a properly designed sealant joint provided.
I. Seal cracks in masonry and concrete with a strip of transition membrane lapped a minimum of 3 inches on both sides of the crack.

3.3 INSTALLATION

A. Transition Membrane
    1. Apply primer as recommended by manufacturer.
    2. Align, position, and adhere transition membrane as required by manufacturer, and press firmly into place. Ensure minimum 2 inch overlap at all end and side laps.
    3. Tie-in to window frames, hollow metal door frames, spandrel panels, roofing system and at the interface of dissimilar materials, providing a minimum 1 inch adhesion on metal and 2 inches on membranes.
    4. Promptly adhere laps and membrane.
    5. Ensure all preparatory work is complete prior to applying air barrier.
B. Through-wall Flashing: Refer to Section 042000.
    1. Coordinate with Section 042000.
    2. Install in accordance with manufacturer's instructions.
    3. Align and position the leading edge of through-wall flashing membrane with the fully adhere membrane over surface.
    4. Press firmly into place. Ensure minimum 2 inch overlap at all end and side laps.
    5. Promptly roll all laps and membrane to effect the seal.
    6. Ensure all preparatory work is complete prior to applying air barrier.
    7. Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the Architect or provide stainless steel drip edge.
    8. Apply through-wall flashing membrane along the base of masonry veneer walls, over windows, doors and all other wall openings. Flashing shall form continuous flashing and extend up a minimum of 8 inches up the back-up wall.
C. Fluid Applied Air Barrier:
    1. Do not apply to wet surfaces.
    2. Apply within manufacturer's recommended temperature limits.
    3. Apply fluid applied materials in single coat in thickness as recommended by manufacturer.
    4. Fill in crevices and grooves making coating continuous and free from breaks and pin holes.
    5. Apply around joints, anchors and into chases, corners and reveals.
    6. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air barrier and at protrusions according to air barrier manufacturer's written instructions and approved tested system in accordance with ABAA air barrier testing procedures.

D. Flexible Flashing and Penetration Membranes:
   1. Clean substrate of dirt, dust, and materials which may impair adhesion.
   2. Apply primer, when required, in accordance with manufacturer's requirements.
   3. Apply tapes around conduits and pipes, door, window and similar openings covering sheathing face and edges.
   4. Turn membrane into wall openings to cover stud webs.
   5. Install without fishmouths and wrinkles.
   6. Press tape into firm contact with substrate.
   7. Lap tape ends minimum of 2 inches.

3.4 FIELD QUALITY CONTROL

A. Owner’s Inspection and Testing/ABAA Audits:
   1. Cooperate with Owner’s testing agency and ABAA auditors.
   2. Allow access to work areas and staging.
   3. Notify Owner’s testing agency/ABAA auditor in writing of schedule for Work of this Section to allow sufficient time for testing and inspection.
   4. Daily inspection and testing may be required.
   5. Do not cover Work of this Section until testing and inspection is accepted.

3.5 PROTECTION

A. Protect air barriers from damage during installation and while left exposed during construction. Repair damage before proceeding with subsequent construction.

B. Air barrier and transition membranes are not designed for permanent exposure. Good practice calls for covering as soon as possible.

END OF SECTION

074625
FURFURYLATED WOOD CLICK-IN CLADDING SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Furfurylated wood cladding.
   2. Rainscreen rail system.

B. Referenced Sections:
   1. Section 061000 - Rough Carpentry
   2. Section 061636 - Wood Sheathing
   3. Section 072500 - Weather Barriers][072726 - Fluid-Applied Membrane Air Barriers]
   4. Section 076200 - Sheet Metal Flashing and Trim
   5. Section 079200 - Joint Sealants

1.2 REFERENCED STANDARDS

A. Edition Dates: Current edition at Bid Date, with applicable appendices and supplements if any, unless otherwise indicated or adopted by authorities having jurisdiction.

B. ASTM International (ASTM):
   1. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
   2. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials

C. National Fire Protection Association (NFPA):
   1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

D. UL LLC, Underwriters Laboratories (UL):
   1. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with the Work of other Sections for sequencing and scheduling to avoid delays, and for completeness of weatherproofing system.
   1. Section [061000] for stud or other solid bearing members.
   2. Section [061643] for sheathing.
   3. Section [072726 for air barrier].
   4. Section 076200 for flashing.
   5. Section 079200 for joint sealants in around penetrations and adjacent construction.

1.4 ACTION SUBMITTALS

A. Product Data: Indicate materials, sizes, profiles, support system, and fasteners.

B. Samples: Two samples of each size and profile of cladding, rail system, and clips, illustrating actual products to be installed.

1.5 DELIV ERY, STORAGE, AND HANDLING

A. Do not deliver until construction work causing moisture, dust, soiling, and potential damage to furfurylated wood cladding system is complete.

B. Conform to manufacturers written instructions. Deliver in original, unopened, protective containers and packaging with seals intact and labels clearly identifying product name and manufacturer.

C. Store cladding, rails, and all products indoors preferably, or off ground, well-ventilated, and under cover at all times until just prior to installation. Protect from dirt, dampness, and damage.

1.6 FIELD CONDITIONS

A. Temperature Range: Between -40 degrees F and 140 degrees F (-40 degrees C and 60 degrees C).

1.7 WARRANTY

A. Manufacturer Warranty: Repair or replace units that fail due to rot:
   1. Commercial: 30-yr non-prorated

PART 2 - PRODUCTS

2.1 MANUFACTURERS/PRODUCTS

A. Acceptable Products:
   1. Kebony US: Click-in Cladding™ System (CCS) (formerly Grad for Kebony), https://us.kebony.com/modified-wood-click-in-cladding-wood-rainscreen-system/, info@kebony.us, +1-833-795-8660.

2.2 WOOD CLADDING

A. Kebony Cladding:
   1. 1 inch by 8 inch nominal, 13/16-inch by 7-31/64-inch (21mm by 190mm).
      a. Gap: As indicated on Drawings.
   2. Fire Test Response Characteristics of Kebony Wood: Class B when tested to ASTM E84 (comparable to UL 723 or NFPA No. 255).
   3. Forest Stewardship Council certified (FSC Mix 70 percent) Radiata Pine furfurylated with bio-based liquid using furfurylation process, treated homogeneously.
   4. Environmental Product Declaration (EPD) or other disclosure and optimization reporting acceptable for LEED requirements.
   5. Density (at 12 percent mc):
      a. 41.8 lb/ft3.
      b. 670 kg/m3.
   6. Janka Hardness:
      a. 1618 lb.

b. 7.2 kN.

7. CE marked according to EN 14915.
8. Nordic Ecolabel 2086 0001 - www.nordic-ecolabel.org.
9. Complies with EU Timber Regulation (EUTR).
10. Kebony products are exempted from the EU's biocide directive (76/769/EEC).

2.3 RAIL SYSTEM

A. Extruded Aluminum Alloy, ASTM B221 6060 T-66, 2.48 inch by 0.93 inch (63 mm by 23.6 mm).

B. Clips: Polyoxymethylene (POM) copolymer.

C. Air Gap: 0.47 inch (12 mm).

D. Aluminum Alloy Recycled Content: 80 percent.
1. Post-Consumer: 45 percent.
2. Pre-Consumer: 35 percent.

2.4 ACCESSORIES

A. [Air Barrier: Specified in Section 072726].

B. [Vapor Barrier Membrane at Wall Openings: Specified in Section 061000.]

C. Rainscreen Ventilation: Cor-A-Vent, Inc. SV-5 Rainscreen Siding Vent, https://www.cor-a-vent.com/sv5.cfm, or Architect-accepted substitution.

D. Grad Riser Support: For roof lines or short runs, use riser support to maintain the correct air gap between the wall surface and the board. The riser support has an opening to face fasten the board using the Pro Plug system for Kebony.

2.5 FINISHES

A. Furfurylated Wood: Natural, unfinished wood.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Confirm suitability of substrates, materials, and Project conditions. Notify Architect in writing of conditions that are not acceptable. Do not begin work of this Section until unacceptable conditions have been corrected.

3.2 PREPARATION

A. Metal Flashings: Specified in Section 076200, installed prior to installing [air barrier] at horizontal intersections with other construction, such as doors and windows heads. Protect from metal interactions according to manufacturer's installation instructions.

B. [Air Barrier][and][Vapor Barrier Membrane]: Installed according to manufacturer's instructions.

3.3 INSTALLATION

A. Install rainscreen rail system, furfurylated wood cladding, and accessories in accordance with manufacturer's printed instructions, and requirements of Contract Documents.

B. Position end joints over solid wood stud framing members. Install siding in longest possible lengths with no board spanning less than three rails.

C. [Gap between cladding joints as specified in Part 2 of this Section. Gap trim and other construction as recommended by manufacturers.]

D. [Install corner trim boards full length of run from soffit to bottom of siding where possible.]

E. Miter horizontal and vertical siding end joints and corners at 45 degree angle and butt tight.

F. Stagger siding end joints to avoid alignment for minimum of 4 adjacent boards over face of wall [or soffit] within a single floor level.
   1. Maintain minimum 24 inch offset between adjacent courses.
   2. Maintain minimum 24 inch overall offset of joints within each three courses.

G. For vertical configurations, install a set screw at the bottom of each vertical board using a Riser Support and the Kebony Pro Plug System.

3.4 ADJUSTING

A. Repair or replace damaged siding and installations not meeting specified tolerances.

3.5 CLEANING

A. Leave installations clean, premises free from residue of work of this Section.

END OF SECTION 074625

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic polyolefin (TPO) roofing system.
2. Mechanically fastened, thermoplastic polyolefin (TPO) roofing system.
3. Loosely laid and ballasted, thermoplastic polyolefin (TPO) roofing system.
4. Substrate board.
5. Roof insulation.
6. Cover board.
7. Walkways.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site

1. For insulation and roof system component fasteners, include copy of [FM Approvals' RoofNav] [SPRI's Directory of Roof Assemblies] listing.

B. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:

1. Layout and thickness of insulation.
2. Base flashings and membrane termination details.
3. Flashing details at penetrations.
4. Tapered insulation layout, thickness, and slopes.
5. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
6. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
7. Tie-in with adjoining air barrier.

C. Samples: For the following products:

1. Roof membrane and flashings, of color required.

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 INFORMATIONAL SUBMITTALS

A. Manufacturer Certificates:

1. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.

a. Submit evidence of compliance with performance requirements.

2. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.

B. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.

C. Research reports.

D. Field Test Reports:

1. Concrete internal relative humidity test reports.
2. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.

E. Field quality-control reports.

F. Sample warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Certified statement from existing roof membrane manufacturer stating that existing roof warranty has not been affected by Work performed under this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 30 years from date of Substantial Completion.

PART 2 – PRODUCTS

1.8 PERFORMANCE REQUIREMENTS

A. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.

B. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746, ASTM D4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4474, UL 580, or UL 1897:

1. Zone 1 (Roof Area Field): <Insert lbf/sq. ft. (kPa/sq. m)>.
2. Zone 2 (Roof Area Perimeter): <Insert lbf/sq. ft. (kPa/sq. m)>.

a. Location: From roof edge to <Insert dimension> inside roof edge.

3. Zone 3 (Roof Area Corners): <Insert lbf/sq. ft. (kPa/sq. m)>.

a. Location: <Insert dimension> in each direction from building corner.

4. Fire/Windstorm Classification: [Class 1A-60] [Class 1A-75] [Class 1A-90] [Class 1A-105] [Class 1A-120] <Insert class>.

D. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

E. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

F. Exterior Fire-Test Exposure: ASTM E108 or UL 790, Class A for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

G. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

1.9 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

A. TPO Sheet: ASTM D6878/D6878M, internally fabric- or scrim-reinforced, fabric-backed TPO sheet.
1. Thickness: 60 mils (1.5 mm) nominal.

1.10 Exposed Face Color: White. AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesive and Sealants: Comply with VOC limits of authorities having jurisdiction.

B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, [55 mils (1.4 mm)] <Insert value> thick, minimum, of same color as TPO sheet.

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Bonding Adhesive: Manufacturer's standard[, water based].

E. Slip Sheet: ASTM D2178/D2178M, Type IV; glass fiber; asphalt-impregnated felt.

F. Slip Sheet: Manufacturer's standard, of thickness required for application.

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

I. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

1.11 SUBSTRATE BOARDS

A. Substrate Board: ASTM C1396/C1396M, Type X gypsum board.

1. Thickness: 5/8 inch (16 mm).

B. Substrate Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M, fiber-reinforced gypsum board.
1. Thickness: [1/4 inch (6 mm)] [1/2 inch (13 mm)] [Type X, 5/8 inch (16 mm)] thick.
2. Surface Finish: [Factory primed] [Unprimed].

C. Substrate Board: ASTM C728, perlite board, seal coated.

1. Thickness: [3/4 inch (19 mm)] [1 inch (25.4 mm)].

D. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

1.12 ROOF INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C578, [Type IV, 1.45-lb/cu. ft. (23-kg/cu. m) minimum density, 25-psi (173-kPa) minimum compressive strength] [Type V, 3.00-lb/cu. ft. (48-kg/cu. m), minimum density, 100-psi (690-kPa) minimum compressive strength], square edged.
1. Thermal Resistance: R-value of 5.0 per inch (25.4 mm).
2. Size: [48 by 48 inches (1219 by 1219 mm)] [48 by 96 inches (1219 by 2438 mm)].
3. Thickness:

a. Base Layer: [1-1/2 inches (38 mm)] <Insert thickness>.
b. Upper Layer: <Insert thickness>.

B. Molded (Expanded) Polystyrene Board Insulation: ASTM C578, Type VIII, 1.15-lb/cu. ft. (18-kg/cu. m) minimum density, 13-psi (90-kPa) minimum compressive strength, square edge.
1. Thermal Resistance: R-value of 3.8 per inch (25.4 mm).
2. Size: [48 by 48 inches (1219 by 1219 mm)] [48 by 96 inches (1219 by 2438 mm)].
3. Thickness:

a. Base Layer: [1-1/2 inches (38 mm)] <Insert thickness>.
b. Upper Layer: <Insert thickness>.

1.13 INSULATION ACCESSORIES

A. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation[and cover boards] to substrate, and acceptable to roofing system manufacturer.

B. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:

1. Modified asphaltic, asbestos-free, cold-applied adhesive.
2. Bead-applied, low-rise, one-component or multicomponent urethane adhesive.
3. Full-spread, spray-applied, low-rise, two-component urethane adhesive.

C. Protection Mat: Woven or nonwoven polypropylene, polyolefin, or polyester fabric; water permeable and resistant to UV degradation; type and weight as recommended by roofing system manufacturer for application.

1.14 WALKWAYS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway [pads] [or] [rolls], approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.

1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
2. Color: Contrasting with roof membrane.

PART 3 – EXECUTION

1.15 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1.16 PREPARATION

A. Perform fastener-pullout tests according to roof system manufacturer's written instructions.

1. Submit test result within 24 hours after performing tests.

a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

1.17 INSTALLATION OF ROOFING, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, [FM Approvals' RoofNav] [SPRI's Directory of Roof Assemblies] listed roof assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.

C. Install roof membrane and auxiliary materials to tie in to existing roofing to maintain weathertightness of transition[and to not void warranty for existing roofing system].

D. Coordinate installation and transition of roofing system component serving as an air barrier with air barrier specified under [Section 072713 "Modified Bituminous Sheet Air Barriers."] [Section 072715 "Nonbituminous Self-Adhering Sheet Air Barriers."] [Section 072726 "Fluid-Applied Membrane Air Barriers."]

1.18 INSTALLATION OF SUBSTRATE BOARD

A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.

1. At steel roof decks, install substrate board at right angle to flutes of deck.

a. Locate end joints over crests of steel roof deck.

2. Tightly butt substrate boards together.
3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
4. Fasten substrate board to top flanges of steel deck according to recommendations in [FM Approvals' RoofNav listed roof assembly requirements for specified Windstorm Resistance Classification] [SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity] and FM Global Property Loss Prevention Data Sheet 1-29.
5. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions.
6. Loosely lay substrate board over roof deck.

1.19 INSTALLATION OF INSULATION

A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.

B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.

C. Installation Over [Wood] [Wood Panel] Decking:

1. Mechanically fasten slip sheet to roof deck using mechanical fasteners specifically designed and sized for fastening slip sheet to [wood] [wood panel] decks.

a. Fasten slip sheet according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
b. Fasten slip sheet to resist specified uplift pressure at corners, perimeter, and field of roof.

2. Install base layer of insulation with [joints staggered not less than 24 inches (610 mm) in adjacent rows] [end joints staggered not less than 12 inches (305 mm) in adjacent rows].

a. Where installing composite and noncomposite insulation in two or more layers, install noncomposite board insulation for bottom layer and intermediate layers, if applicable, and install composite board insulation for top layer.
b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
d. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).

1) Trim insulation so that water flow is unrestricted.

e. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
f. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
g. Loosely lay base layer of insulation units over substrate.

3. Mechanically attach base layer of insulation[and substrate board] using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to [wood] [wood panel] decks.

a. Fasten insulation according to requirements in SPRI's Directory of Roof Assemblies for specified Wind Uplift Load Capacity.
b. Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.

4. Install upper layers of insulation[and tapered insulation] with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation.

a. Staggered end joints within each layer not less than 24 inches (610 mm) in adjacent rows.

b. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
c. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
d. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
e. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).

1) Trim insulation so that water flow is unrestricted.

f. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
g. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
h. Loosely lay each layer of insulation units over substrate.
i. Adhere each layer of insulation to substrate using adhesive according to SPRI's Directory of Roof Assemblies listed roof assembly requirements for specified Wind Uplift Load Capacity and FM Global Property Loss Prevention Data Sheet 1-29, as follows:

1) Set each layer of insulation in a solid mopping of hot roofing asphalt, applied within plus or minus 25 deg F (14 deg C) of equiviscous temperature.
2) Set each layer of insulation in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.
3) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

1.20 INSTALLATION OF ADHERED ROOF MEMBRANE

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel[and Owner's testing and inspection agency].

D. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

F. Hot Roofing Asphalt: Apply a solid mopping of hot roofing asphalt to substrate at temperature and rate required by manufacturer, and install fabric-backed roof membrane. Do not apply to splice area of roof membrane.

G. Fabric-Backed Roof Membrane Adhesive: Apply to substrate at rate required by manufacturer, and install fabric-backed roof membrane.

H. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

I. Apply roof membrane with side laps shingled with slope of roof deck where possible.

J. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

K. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

1.21 INSTALLATION OF MECHANICALLY FASTENED ROOF MEMBRANE

A. Mechanically fasten roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. For in-splice attachment, install roof membrane with long dimension perpendicular to steel roof deck flutes.

D. Start installation of roofing in presence of roofing system manufacturer's technical personnel[and Owners testing and inspection agency].

E. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

F. Mechanically fasten or adhere roof membrane securely at terminations, penetrations, and perimeter of roofing.

G. Apply roof membrane with side laps shingled with slope of roof deck where possible.

H. In-Seam Attachment: Secure one edge of TPO sheet using fastening plates or metal battens centered within seam, and mechanically fasten TPO sheet to roof deck.

I. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and flashing sheet.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

J. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

1.22 INSTALLATION OF LOOSELY LAID AND BALLASTED ROOF MEMBRANE

A. Loosely lay roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Comply with requirements in ANSI/SPRI RP-4 for [System 1] [System 2] [System 3].

D. Start installation of roofing in presence of roofing system manufacturer's technical personnel and Owner's testing and inspection agency.

E. Accurately align roof membrane, without stretching, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

F. Mechanically fasten or adhere roof membrane at corners, perimeters, and transitions according to requirements in ANSI/SPRI RP-4.

G. Apply roof membrane with side laps shingled with slope of deck where possible.

H. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and flashing sheet.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

I. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

1.23 INSTALLATION OF BASE FLASHING

A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.

B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

1.24 INSTALLATION OF WALKWAYS

A. Flexible Walkways:

1. Install flexible walkways at the following locations:

a. Retain one or more subparagraphs below. Revise to suit Project.
b. Perimeter of each rooftop unit.
c. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
d. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
e. Top and bottom of each roof access ladder.
f. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
g. Locations indicated on Drawings.
h. As required by roof membrane manufacturer's warranty requirements.

2. Provide 6-inch (76-mm) clearance between adjoining pads.
3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

1.25 PROTECTING AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

SECTION 076200
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fabrication and installation of new flashing.
2. Salvage and reinstallation of copper gutters and downspouts.
3. Fabrication and installation of new copper gutters, downspouts, and scuppers.

B. Related Requirements:
1. Section 074625: Furfurylated Wood Click-In Cladding System.

1.2 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leak proof, secure, and noncorrosive installation. Ensure best possible weather resistance and durability of the work and protection of materials and finishes.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 SUBMITTALS

A. Survey and restoration program detailing sheet metal work and flashing work, including protection of surrounding materials on building and site operations. Describe in detail the proposed materials, methods and equipment to be used for this and related portions of the Work, including a schedule of copper gutters, downspouts and trim that can be removed and reinstalled.

B. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

C. Shop Drawings of each item specified showing layout, profiles, methods of joining, substrates and anchorage details.

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.

E. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

F. Sample Warranty: For special warranty.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Engage experienced Sheet Metal Fabrication and Installation firm(s) that have a minimum of 5 years of documented, specialized experience in the specific types of sheet metal and flashing work required for this Project.

B. Mockups: Prior to installing sheet metal fabrication, construct mockups to verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.

1. Build mockup of typical roof eave, including built-in gutter, approximately 10 feet long, including supporting construction cleats, seams, attachments, and accessories.
2. Demonstrate the proposed range of aesthetic effects and workmanship.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall 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 shall not rattle, leak, or loosen, and shall remain watertight.

B. Historic Preservation: The goal of this roof replacement project is to match the appearance of the existing, historic roof. Reuse existing gutters, downspouts and accessories where possible and all new sheet metal installations shall match the existing as closely as possible.

C. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

D. Sheet Metal Standard for Copper: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping. Match existing sheet metal type, finish and weight.

B. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 or H01 temper. Match weight of existing copper sheets. Provide basket type strainer of No. 14 B&S gauge copper or brass at outlet.
1. Prepatinated Copper-Sheet Finish: Verdigris, prepatinated according to ASTM B 882, to match existing copper color and finish as closely as possible.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; non-perforated.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

B. Fasteners: Same metal as sheet metal flashing or other non-corrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.

C. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of Work, matching or compatible with material being installed; non-corrosive; size and thickness required for performance.

D. Solder: ASTM B 32, Grade Sn50, used with rosin flux.

E. Elastomeric Sealant: Generic type recommended by sheet metal manufacturer and fabricator of components being sealed.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to match existing details and comply with recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim to comply with recommendations of SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of the item indicated.
2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than the existing sheet metal.
3. Obtain field measurements for accurate fit before shop fabrication.
4. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Unless otherwise indicated, install sheet metal fabrication, flashing, and trim to comply with performance requirements, manufacturer's installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Anchor units of Work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install Work with laps, joints, and seams that will be permanently watertight and weatherproof.

B. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
4. Torch cutting of sheet metal flashing and trim is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

C. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

D. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Sealed Joints: Form non-expansion, but movable, joints in metal to accommodate elastomeric sealant to comply with SMACNA standards. Fill joint with sealant and form metal to completely conceal sealant.

G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches; however, reduce pre-tinning where pre-tinned surface would show in completed Work.
1. Do not use torches for soldering.
2. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Copper Soldering: Tin edges of uncoated sheets, using solder for copper.

3.3 ROOF-DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system. Reuse existing copper drainage system elements whenever possible, and any new items shall match the existing in size, detail and finish.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering. Clean and neutralize flux materials. Clean off excess solder. Clean off excess sealants.

B. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

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.

3.6 COMPLETED WORK

A. Completed work will be neat in appearance; will be solidly installed; flashing will form a waterproof layer that will properly drain water, resist wind damage, and allow for expansion and contraction without stressing the metal components.

END OF SECTION 076200

SECTION 077100
ROOF SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Copings.
   2. Roof-edge specialties.
   3. Roof-edge drainage systems.
   4. Reglets and counterflashings.

B. Related Sections:
   1. Section 075423 – Thermoplastic Polyolefin (TPO) Roofing

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data: For each type of product.

C. Shop Drawings: For roof specialties.
   1. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work.

D. Samples: For each type of roof specialty and for each color and texture specified.

E. Information Submittals:
   1. Product Test Reports: For tests performed by a qualified testing agency.
   2. Sample warranty.

F. Closeout Submittals:
   1. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are FM Approvals listed for specified class and SPRI ES-1 tested to specified design pressure.

1.4 WARRANTY

   1. Roofing-System Warranty: Roof specialties are included in warranty provisions in Section 075423 – Thermoplastic Polyolefin (TPO) Roofing

B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
      d. Verify available warranties and warranty periods for finishes with manufacturers listed in Part 2 articles. Twenty-year or longer periods are for fluoropolymer finishes and are included with manufacturers' published data; longer periods for premium finishes may be available.
      e. Finish Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. FM Approvals' Listing: Manufacture and install roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, [Class 1-60] [Class 1-75] [Class 1-90] [Class 1-105] [Class 1-120] Identify materials with FM Approvals' markings.

B. SPRI Wind Design Standard: Manufacture and install [copings] [roof-edge specialties] tested according to SPRI ES-1 and capable of resisting the following design pressures:

1. Design Pressure: .As indicated on Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C) material surfaces.

2.2 ROOF-EDGE DRAINAGE SYSTEMS

A. Gutters: Manufactured in uniform section lengths not exceeding [12 feet (3.6 m), with matching corner units, ends, outlet tubes, and other accessories. Elevate back edge at least 1 inch (25 mm) above front edge. Furnish flat-stock gutter straps, gutter brackets, expansion joints, and expansion-joint covers fabricated from same metal as gutters.

1. Zinc-Coated Steel: Nominal [0.028-inch (0.71-mm)] [0.034-inch (0.86-mm)] thickness.
2. Aluminum Sheet: [0.032 inch (0.81 mm)] [0.040 inch (1.02 mm)] [0.050 inch (1.27 mm)] [0.063 inch (1.60 mm)] thick.
3. Copper Sheet: [16 oz./sq. ft. (0.55 mm thick)] [20 oz./sq. ft. (0.68 mm thick)]
4. Gutter Profile: As indicated according to SMACNA's "Architectural Sheet Metal Manual."
5. Corners: Factory mitered and continuously welded.
6. Gutter Supports: Manufacturer's standard supports as selected by Architect with finish matching the gutters.

B. Downspouts: Match existing profile complete with mitered elbows, manufactured from the following exposed metal. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Zinc-Coated Steel: Nominal [0.028-inch (0.71-mm)] [0.034-inch (0.86-mm)] thickness.
2. Formed Aluminum: [0.032 inch (0.81 mm)] [0.040 inch (1.02 mm)] [0.050 inch (1.27 mm)] [0.063 inch (1.60 mm)] thick.

C. Zinc-Coated Steel Finish: [Two-coat fluoropolymer].

1. Color: As selected by Architect from manufacturer's full range.

D. Aluminum Finish: [[Two-coat fluoropolymer].

1. Color: As selected by Architect from manufacturer's full range.

2.3 REGLETS AND COUNTERFLASHING

A. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:

1. Zinc-Coated Steel: Nominal [0.022-inch (0.56-mm)] [0.028-inch (0.71-mm)] thickness.
2. Formed Aluminum: [0.024 inch (0.61 mm)] [0.050 inch (1.27 mm)] thick.
3. Stainless Steel: [0.0188 inch (0.477 mm)] [0.0250 inch (0.635 mm)] thick.
4. Corners: Factory mitered and [continuously welded].

5. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
6. Stucco Type, Embedded: Provide reglets with upturned fastening flange and extension leg of length to match thickness of applied finish materials.
7. Concrete Type, Embedded: Provide temporary closure tape to keep reglet free of concrete materials, special fasteners for attaching reglet to concrete forms, and guides to ensure alignment of reglet section ends.
8. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
9. Multiuse Type, Embedded: For multiuse embedment in masonry mortar joints.

B. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches (100 mm) and in lengths not exceeding [12 feet (3.6 m)] > designed to snap into [reglets] and compress against base flashings with joints lapped, from the following exposed metal:

1. Zinc-Coated Steel: Nominal [0.022-inch (0.56-mm)] [0.028-inch (0.71-mm)] thickness.
2. Formed Aluminum: [0.024 inch (0.61 mm)] [0.032 inch (0.81 mm)] thick.
3. Stainless Steel: [0.0188 inch (0.477 mm)] [0.0250 inch (0.635 mm)] > thick.

C. Accessories:

1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

D. Zinc-Coated Steel Finish: [Two-coat fluoropolymer] .

1. Color: As selected by Architect from manufacturer's full range.

E. Aluminum Finish: [Mill] [Two-coat fluoropolymer].

2.4 MATERIALS

A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation.

B. Aluminum Sheet: ASTM B209 (ASTM B209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

2.5 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
1. Thermal Stability: ASTM D1970/D1970M; stable after testing at 240 deg F (116 deg C).

2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F (29 deg C).

B. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt, nonperforated.

C. Slip Sheet: Rosin-sized building paper, 3-lb/100 sq. ft. (0.16-kg/sq. m) minimum.

2.6 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
2. Fasteners for Copper Sheet: Copper, hardware bronze, or passivated Series 300 stainless steel.
3. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
4. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
5. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.

B. Coil-Coated Aluminum Sheet Finishes:

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2.

2.7 FINISHES

A. Coil-Coated Galvanized-Steel Sheet Finishes:

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with ASTM A755/A755M and coating and resin manufacturers' written instructions.

a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
b. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.
c. Two-Coat Mica Fluoropolymer: AAMA 621. Fluoropolymer finish with suspended mica flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
d. Three-Coat Metallic Fluoropolymer: AAMA 621. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.

B. Coil-Coated Aluminum Sheet Finishes:

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

    a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
    b. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.
    c. Two-Coat Mica Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended mica flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in color coat.
    d. Three-Coat Metallic Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat.

2. Clear Anodic Finish: AAMA 611, [AA-M12C22A41, Class I, 0.018 mm] [AA-M12C22A31, Class II, 0.010 mm] or thicker.
3. Color Anodic Finish: AAMA 611, [AA-M12C22A42/A44, Class I, 0.018 mm] [AA-M12C22A32/A34, Class II, 0.010 mm] or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT

A. Self-Adhering Sheet Underlayment: Apply primer if required by manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation. Apply wrinkle free, in shingle fashion to shed water, and with end laps of not less than 6 inches (152 mm) staggered 24 inches (610 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

    1. Apply continuously under [copings] [roof-edge specialties] [and] [reglets and counterflashings].
    2. Coordinate application of self-adhering sheet underlayment under roof specialties with requirements for continuity with adjacent air barrier materials.

B. Felt Underlayment: Install with adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

C. Slip Sheet: Install with tape or adhesive for temporary anchorage to minimize use of mechanical fasteners under roof specialties. Apply in shingle fashion to shed water, with lapped joints of not less than 2 inches (50 mm).

3.2 INSTALLATION, GENERAL

A. Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of [uncoated aluminum] [and] [stainless steel] roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.

1. Space movement joints at a maximum of [12 feet (3.6 m)] with no joints within [18 inches (450 mm)] of corners or intersections unless otherwise indicated on Drawings.
2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.

D. Fastener Sizes: Use fasteners of sizes that penetrate [substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance].

E. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

F. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.3 INSTALLATION OF ROOF-EDGE DRAINAGE SYSTEM

A. Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.

B. Gutters: Join and seal gutter lengths. Allow for thermal expansion. Attach gutters to firmly anchored gutter supports spaced not more than [12 inches (305 mm)] [24 inches (610 mm)] [30 inches (762 mm)] <Insert dimension> apart. Attach ends with rivets and [seal with sealant] [solder] to make watertight. Slope to downspouts.

1. Install gutter with expansion joints at locations indicated but not exceeding [50 feet (15.2 m)] apart. Install expansion-joint caps.
2. Install continuous leaf guards on gutters with noncorrosive fasteners, [removable] [hinged to swing open] for cleaning gutters.

C. Downspouts: Join sections with manufacturer's standard telescoping joints. Provide hangers with fasteners designed to hold downspouts securely to walls and 1 inch (25 mm) away from walls; locate fasteners at top and bottom and at approximately [60 inches (1500 mm)] o.c.

1. Provide elbows at base of downspouts at grade to direct water away from building.

3.4 INSTALLATION OF REGLETS AND COUNTERFLASHINGS

A. Embedded Reglets: See [Section 033000 "Cast-in-Place Concrete"] [and] [Section 042000 "Unit Masonry"] for installation of reglets.

B. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches (100 mm) over top edge of base flashings.

C. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches (100 mm) over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with butyl sealant. Fit counterflashings tightly to base flashings.

3.5 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed.

END OF SECTION

SECTION 079200
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
   1. Section 076000 - Flashing and Sheet Metal.
   2. Section 092900 - Gypsum Board Assemblies.
   3. Section 093000 - Tiling.

1.2 DEFINITIONS

A. Use definitions in ASTM C717.
B. Non-Bleeding: Not capable of exuding liquid chemical components of sealant.
C. Non-Staining: Not capable of discoloring joint substrate.
D. Sealant System: Sealant, sealant backing, and primer intended for use in particular condition.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data:
   1. Submit product data and product specifications for each product.
   2. Include data to indicate chemical characteristics, performance criteria, limitations, substrate preparation, installation requirements, and curing requirements.
   3. Include information for accessories and other required components.
   4. Include color charts indicating manufacturer’s full color range available of each sealant type for Architect’s initial selection.
C. Samples: Submit four 1/4 inch diameter by 2 inch long samples illustrating sealant colors for each product exposed to view.
D. Informational Submittals:
   1. Test Reports: Submit written results of testing specified as part of Source and Field Quality Control articles.
   2. Certifications specified in Quality Assurance article.
   3. Qualification Data: Manufacturer's and installer's qualification data.
   4. Manufacturer's instructions. Include requirements for surface preparation, priming, joint size ratios, adhesion testing, and perimeter conditions requiring special attention.
   5. Manufacturer's field reports.
E. Closeout Submittals:
   1. Submit under provisions of Section 017700.
   2. Warranty: Submit specified warranty.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility:
   1. Provide products for each sealant system from one manufacturer for entire Project, unless otherwise acceptable to Architect.
   2. Provide products from a single manufacturer to ensure material compatibility where different sealant materials come in direct contact with each other.
   3. Provide each sealant system as complete unit, including accessory items necessary for proper function.
B. Fabricator Qualifications: Company specializing in manufacturing products specified in this Section with minimum 5 years experience.
C. Applicator Qualifications: Acceptable to manufacturer, specializing in applying sealants, with experience on at least 5 projects of similar nature in past 5 years.

D. Certifications:
   1. Manufacturer's Certification that Products:
      a. Furnished for Project meet or exceed specified requirements.
      b. Assembled for each joint are compatible with each other and with joint substrates under conditions of service and application.
      c. Are suitable for the indicated use.
   2. Manufacturer's certification that sealants, primers, and cleaners, comply with local regulations controlling the use of volatile organic compounds.
   3. Contractor's and installer's certification that products are installed in accordance with Contract Documents, based on inspection and testing specified as part of Field Quality Control.

1.5 FIELD SAMPLES
A. General: Comply with provisions of Section 014500.
B. Preconstruction Field Sample:
   1. Construct sealant joint mock-up 5 feet long for elastomeric joint sealants specified in this Section.
   2. Position at location directed by Architect.
   3. Construct minimum of 3 weeks prior to scheduled installation.
   4. Perform "field hand-pull adhesion test" described under Field Quality Control, one per each different substrate on the building exterior envelope. Pull Test to be performed 21 days after installation of field sample.

1.6 PRE-INSTALLATION CONFERENCE
A. Conduct pre-installation conference in accordance with Section 013119.
B. Convene pre-installation conference 3 weeks prior to commencing work of this Section.
C. Conference Purpose and Agenda:
   1. Visit Project site to analyze site conditions, and inspect surfaces and joints to be sealed in order that recommendations may be made should adverse conditions exist.
   2. Review mock-up and field sample.
   3. Discuss following items:
      a. Substrate conditions.
      b. Preparatory work.
      c. Weather conditions under which work will be done.
      d. Anticipated frequency and extent of joint movement.
      e. Joint design.
      f. Sealant installation procedures.

1.7 DELIVER, STORAGE, AND HANDLING
A. Comply with requirements of Section 016600.
B. Deliver materials to site in unopened containers and bundles with labels indicating:
   1. Manufacturer's name.
   2. Product name and designation.
   3. Color.
   4. Expiration period for use.
   5. Working life.
   6. Curing time.
   7. Mixing instructions for multi-component materials.
C. Storage and Protection:

1. Store products within manufacturer's required temperature and humidity ranges.
2. Prior to use, condition products within manufacturer's required temperature range, humidity range, and time period.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Apply sealant when the following are within manufacturer's limits during and for 24 hours after sealant installation:
   2. Ambient and surface temperatures.
   3. Relative humidity.
   4. Do not apply sealants to wet or frozen surfaces.
   5. Comply with manufacturer's requirements regarding application of sealants in vicinity of curing sealants of a different material.

1.9 SEQUENCING

A. Coordinate work with Sections referencing this Section.
B. Coordinate installation of sealants with substrates to which they are applied.

1.10 WARRANTY

A. Provide warranties under provisions of Section 017700.
B. Manufacturer's Warranty:
   1. Silicone Sealants: Standard twenty (20) year Warranty against failure of material.
   2. Other Sealants: Standard five (5) year Warranty against failure of material.
C. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: Two (2) years from date of Substantial Completion.
D. Include coverage for installed sealants and accessories which:
   1. Fail to achieve air tight seal.
   2. Fail to achieve watertight seal.
   3. Exhibit loss of adhesion.
   4. Exhibit loss of cohesion.
   5. Do not cure.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acrylic Latex (Designation AL):
   1. Description:
      a. ASTM C834.
      b. Non-sag; non-staining; non-bleeding.
      c. Joint movement range without cohesive/adhesive failure: Plus 7.5 percent to minus 7.5 percent of joint width.
      d. Color: As selected by Architect from manufacturer's full color range.
   2. Acceptable Products:
      a. AC-20, Pecora Corporation.
      b. Sonolac, Sonneborn Division of BASF Building Systems, Shakopee, MN.
      c. Acrylic Latex Tremflex 834, Tremco, Inc.
B. Silicone—General Purpose (Designation S-GP):
   1. Description:

2. ASTM C920:
    a. Type: S
    b. Grade: NS
    c. Class: 50
    d. Uses: NT, G, A, O
3. Single component, neutral curing, non-staining, non-bleeding silicone sealant.
4. Medium modulus silicone for metal to metal and metal to adjacent substrates; Low modulus silicone for all other locations.
5. Joint movement range without cohesive/adhesive failure: Plus 50 percent to minus 50 percent of joint width.
6. Color: Selected by Architect from manufacturer's full color range.
7. Acceptable Medium Modulus Products:
    a. 795, Dow Corning.
    b. Silpruf, General Electric.
    c. Spectrem 2, Tremco.

C. Silicone—Sanitary (Designation S-S):
1. Description:
    a. ASTM C920:
        1) Type: S
        2) Grade: NS
        3) Class: 25
        4) Uses: NT, M, G, A, O
    b. Neutral or acid curing, non-staining, non-bleeding, fungicide-containing.
    c. Color: White.
2. Acceptable Products:
    a. 786 Mildew-Resistant Silicone Sealant, The Dow Chemical Company.
    b. Sanitary 1700, General Electric Silicones.
    c. Tremsil 200 Sanitary, Tremco

D. Urethane—Traffic-Bearing (Designation U-TB): ASTM C920, Type M, Grade P:
1. Sealant containing mercury not allowed.
2. Class: 25. Joint movement range without cohesive/adhesive failure: Plus 25 percent to minus 25 percent of joint width.
3. Uses: T, M, O
4. Chemical curing, non-staining, non-bleeding.
5. Shore A Hardness: 40 minimum, when tested in accordance with ASTM C661.
6. Color: As selected by Architect from complete range available from manufacturer.
7. Acceptable Products.
    a. NR-200, Pecora.
    b. Vulkem 245, Tremco.
    c. Sikaflex 2c/SL, Sika.
    d. SL 2 Sealant, Sonneborn Division of BASF Building Systems, Shakopee, MN.
    e. THC-900, Tremco.

E. Urethane—Traffic-Bearing (Designation U-TB): ASTM C920, Type M, Grade NS:
1. Sealant containing mercury not allowed.
2. Class: 25. Joint movement range without cohesive/adhesive failure: Plus 25 percent to minus 25 percent of joint width.
3. Uses: T, M, O
4. Chemical curing, non-staining, non-bleeding.

5. Shore A Hardness: 40 minimum, when tested in accordance with ASTM C661.
6. Color: As selected by Architect from complete range available from manufacturer.
7. Acceptable Products.
    a. Dynatred, Pecora.
    b. THC 901, Tremco.

F. Insulating Air Foam Sealant (Designation U-IA):
1. Description: Insulating two component polyurethane foam air sealant for sealing gaps, cracks, and holes through openings, joints, and connections between building components.
2. Provide material manufactured to stop air and vapor leakage to exterior assemblies from pool atmosphere areas.
3. Provide high yield, quick curing materials.
4. Provide in two component containers with gun applicator and nozzle lengths as necessary to reach voids.
5. Acceptable Product:
    a. Zerodraft Insulating Air Sealant.
    b. Dow Froth Pak, Dow Chemical Company.

G.

2.2 COMPONENTS

A. Accessibility Guidelines: Operable parts for all accessible casework shall comply with CBC Section 11B-309.

B. Hardware:
1. Drawer Slides:
    a. General: Steel ball-bearing, full extension, soft close feature integrated into slide profile.
        1) Capacity: 100 pound medium duty.
    b. Acceptable Manufacturers:
        1) Accuride, Santa Fe Springs, CA.
        2) Hettich America LP, Alpharetta, GA.
        3) Hafele.
2. Heavy-duty Lateral Drawer Slides:
    a. General: Steel ball-bearing, full extension, soft-close feature integrated into slide profile, 200 pound capacity minimum.
    b. Acceptable Manufacturers:
        1) Accuride.
        2) Hettich America LP.
        3) Hafele.
3. Hinges:
    a. General: Concealed "European" style, 170 degree opening.
    b. Acceptable Manufacturers:
        1) Julius Blum Company, Inc.
        2) Grass America, Inc.
        3) Stanley Hardware.
4. Pulls:
    a. Finish: Clear anodized aluminum.
    b. Acceptable Manufacturers:
        1) EPCO Engineered Products Company.
        2) Stanley Hardware.

3) Ives, Allegion.

5. Shelf Support Pins:
   a. Nickel Steel.
   b. Location: 4 per shelf.
   c. Acceptable Products and Manufacturers:
      1) Hafele 282.04.711.
      2) Knape & Vogt 333.
6. Shelf Standards and Supports:
   a. General: Steel, surface mounted, adjustable on 1/2 inch centers. Clip type supports.
   b. Finish: Color finish selected by Architect.
   c. Acceptable Products and Manufacturers:
      1) Knape and Vogt Manufacturing.
7. Grommets:
   a. General: Minimum 2 inch hole, color as selected by Architect.
   b. Acceptable Products and Manufacturers:
      1) Doug Mockett and Company, Inc.
      2) Hafele America Company.
8. Cantilevered Aluminum Countertop Support:
   a. Material: 6063 T-6 “T-shape” extruded aluminum.
   b. Finish: Off white powder coat.
   c. Thickness: 0.250
   d. Counter Depth: To 25-inches.
   e. Basis of Design: Rakks EH-Inside Wall Mount Model #EH-1818FM, Rangine Corporation.

2.3 ACCESSORIES

A. Joint Cleaner:
   1. Chemical cleaners required by sealant manufacturer for substrates encountered, compatible with sealant backing bond breaker materials.
   2. Free of substances capable of staining, corroding, or harming:
      a. Joint substrates.
      b. Adjacent nonporous surfaces.
      c. Sealant.
      d. Sealant backing.
   3. Formulated to promote optimum adhesion of sealants to joint substrates.

B. Primer:
   1. Dyed coating material required by sealant manufacturer for enhancing sealant adhesion to joint substrates.
   2. Non-staining to joint substrate beyond the substrate surface.
   3. Required for use unless not required by results of:
      a. "Manufacturer’s sealant-substrate compatibility and adhesion test" described under Source Quality Control.
      b. "Field hand-pull adhesion test" under Field Quality Control.

C. Sealant Backing Bond Breaker Rod:
   1. Non-staining material.
   2. Compatible and non-adhering to sealant when tested in accordance with ASTM C1087.
   3. Compatible with sealant, joint substrates, primers, and other sealant backing bond breakers.

4. Sealant manufacturer approved.
5. Sized and shaped to provide optimum performance and backing to sealant.
6. Preformed, compressible, resilient, non-staining, non-outgassing, non-waxing, non-extruding, cylinder-shaped plastic foam rods compliant with ASTM D1056.
7. Open Cell Polyurethane: Use not permitted unless required by sealant manufacturer.
8. Closed Cell Polyethylene:
   a. Non-absorbent to liquid water.
   b. Use in wall and ceiling joints unless otherwise required by sealant manufacturer.
9. Reticulated Polymeric: Sof®-Rod, Nomaco, Inc.
10. Unless otherwise required by sealant manufacturer, oversize rod to be larger than joint width by following minimum amounts:
    a. Open Cell Polyethylene: 50 percent.
    b. Closed Cell Polyethylene: 33 percent.
    c. Reticulated Polymeric: 25 percent.

D. Elastomeric Tubing Joint Filler:
1. Neoprene, butyl, EPDM, or silicone tubing compliant with ASTM D1056.
2. Shore A hardness of 70.
3. Compatible with sealant, joint substrates, primers, and other sealant backing bond breakers.
4. Use in pavement joints, unless otherwise required by sealant manufacturer.
5. Use sealant backing bond breaker tape to separate sealant from rod.
6. Unless otherwise required by sealant manufacturer, oversize rod to be larger than joint width by 25 percent the following minimum amounts:

E. Sealant Backing Bond Breaker Tape:
1. Pressure sensitive polyethylene tape or tetrafluorethylene self-adhesive tape required by sealant manufacturer to suit application.
2. Minimum Thickness of 11 mils.

F. Masking Tape: Non-staining, non-absorbent material compatible with sealants and surfaces adjacent to joints.

G. Tooling Liquids: Non-staining material approved by manufacturer to reduce adhesion of sealant to joint finishing tools.

2.3 MIXES

A. Comply with manufacturer’s instructions.
B. Mix thoroughly with mechanical mixer without mixing air into sealants.
C. Continue mixing until sealant is uniform in color and free from streaks of unmixed materials.

2.4 SOURCE QUALITY CONTROL

A. General: Comply with requirements of Section 014500.
B. Tests:
1. Coordinate testing of sealant compatibility and adhesion to:
   a. Sealant backing materials.
   b. Entrance system specified in Section 084113.
   c. Tile specified in Section 093000.
2. Manufacturer’s Sealant-Substrate Compatibility and Adhesion Test:
   a. Test Methods:
      1) Determine if priming and other specific joint preparation techniques are not required to obtain rapid, optimum adhesion of sealants to joint substrates.
      2) Comply with ASTM C510, ASTM C794, and ASTM C1087.

b. Submit not less than 9 pieces 3 by 5 inches in size of each type of material, including joint substrates, shims, sealant backing, and miscellaneous materials.
c. Schedule sufficient time for testing and analysis of results to prevent delay in the progress of the Work.
d. Investigate sealant material's failing compatibility/adhesion tests and obtain manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
e. Include in Test Report, Manufacturer's:
    1) Interpretation of test results regarding sealant performance.
    2) Primers and substrate preparation required to achieve adhesion.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work when substrate conditions are acceptable to manufacturer and installer.
B. Ensure that concrete and masonry have cured minimum of 28 days.
C. Verify that sealant backing is compatible with sealant.
D. Verify that substrate surface:
    1. Is within manufacturer's moisture content range.
    2. Complies with manufacturer's cleanliness and surface preparation requirements.
E. Joint Width:
    1. Verify joints are greater than minimum widths required by manufacturer.
    2. If joints are narrower than minimum required widths, widen narrow joints to indicated width.
    3. Do not place sealant in joints narrower than manufacturer's required minimum.

3.2 PREPARATION

A. Prepare, clean, and prime joints in accordance with manufacturer's instructions.
B. Remove loose materials and matter which might impair adhesion of primer and sealant to substrate.
C. Remove form release agents, laitance, and chemical retarders, which might impair adhesion of primer and sealant to concrete and masonry surfaces.
D. Comply with ASTM C1193.
E. Protect elements adjoining and surrounding work of this Section from damage and disfiguration.
F. Priming:
    1. Prime joint substrates unless priming is not required by:
        a. "Manufacturer's sealant-substrate compatibility and adhesion test" described in Source Quality Control article.
        b. "Field hand-pull adhesion test" described in Field Quality Control article.
    2. Apply primer to substrate areas where joint sealant is to adhere.
    3. Comply with manufacturer's sequencing requirements for joint priming and sealant backing bond breaker rod installation to assure required primer application coverage and rate without placement of primer on backer rod surface to be in contact with sealant and avoid three-sided sealant adhesion.
    4. Do not allow spillage and migration of primer onto surfaces not to receive primer.
    5. Install sealant to primed substrates after primer has cured.
G. Masking Tape:
    1. Use masking tape to prevent contact of primer and sealant with adjoining surfaces that would be permanently stained or damaged by:
        a. Contact with primer and sealant.

b. Cleaning methods used to remove primer and sealant smears.

2. Place continuously along joint edges.
3. Apply masking tape so it does not shift in position after placement.

3.3 APPLICATION

A. General:
   1. Comply with requirements of Section 017300.
   2. Comply with results and recommendations from:
      a. "Manufacturer's compatibility and adhesion test" described in Source Quality Control Article.
      b. "Field hand-pull adhesion test" described in Field Quality Control article.
   3. Provide compatible sealant system between dissimilar assemblies and adjacent construction.
   4. Seal locations necessary to create and secure continuous air, water, and vapor enclosure even though Contract Documents may not indicate all locations; do not seal weep holes.
   5. Seal to prevent migration of water, vapor, and air through joints.
   6. Comply with manufacturer's required application temperature and relative humidity ranges. Consult manufacturer when sealant cannot be applied within these ranges.

B. Sealant Backing Bond Breaker:
   1. Measure joint dimensions and size materials to achieve manufacturer-required width-to-depth ratios.
   2. Install to achieve sealant depth and sealant contact depth no greater than distance required by manufacturer for sealant material, joint width, and joint movement range.
   3. Install using blunt instrument to avoid puncturing.
   4. Do not:
      a. Twist, puncture, and tear material.
      b. Leave gaps between ends of material pieces.
      c. Stretch or compress material along its length.
      d. Stretch or compress tape material along its width.
   5. Install to provide optimum joint profile and in manner to provide not less than 1/4 inch sealant depth when tooled.
   6. Install tape where insufficient joint depth makes use of rod not possible. Match tape width to joint width to prevent three-side adhesion. Do not wrap tape onto sides of the joint.
   7. Replace backing bond breaker materials which have become wet with dry materials prior to sealant application.

C. Sealant:
   1. Install sealants at same time as installation of backing bond breaker materials.
   2. Do not exceed manufacturer's required:
      a. Material shelf life.
      b. Material working life.
      c. Installation time after mixing.
   3. Comply with manufacturer's requirements for applying different sealant materials in direct contact with each other.
   4. Use gun nozzle size to suit joint size and sealant material.
   5. Install sealant with pressure-operated devices to form uniform continuous bead.
   6. Use sufficient pressure to fill voids and joints full.
   7. Install to adhere to both sides of joint.
   8. Install to not adhere to back of joint; provide sealant backing.

9. Install sealant free of air pockets and embedded matter.
10. Recess sealant 1/8 inch from surface of pavements and horizontal surfaces.
11. Use insulating air sealant in accordance with manufacturer's instructions to fill gap, cracks and voids, to stop air and vapor transmission.

D. Sealant Tooling:
   1. Comply with manufacturer's tooling method requirements.
   2. Tool sealant within manufacturer's tooling time limits.
   3. Tooling liquids:
      a. Comply with manufacturer's requirements regarding use.
      b. Do not use when not permitted by manufacturer.
      c. Do not allow tooling liquids to come in contact with surfaces receiving sealant.
   4. Produce smooth exposed surface.
   5. Tool Sealant to be Free of:
      a. Air pockets and voids.
      b. Embedded impurities.
      c. Surface ridges, sags, and indentations.
   6. Achieve full sealant contact and adhesion with substrate.
   7. Form a concave tooled joint shape indicated in Section A of Figure 5 of ASTM C1193, unless otherwise indicated.
   8. Remove excess sealant from surfaces adjacent to joint.
   9. Allow acrylic latex sealant to achieve firm skin before paint is applied.

E. Masking Tape:
   1. Remove immediately after tooling sealant and before sealant skin forms.

3.4 FIELD QUALITY CONTROL

A. General: Comply with requirements of Section 014500.

B. Field Hand-Pull Adhesion Test:
   1. At field sample:
      a. Before sealant installation is commenced, test materials for indications of staining and poor adhesion to substrate.
      b. Perform after sealants have fully cured.
      c. Perform under observation of Architect and manufacturer's technical representative.
   2. Subsequent to commencement of sealant installation:
      a. Perform under observation of manufacturer's technical representative.
      b. Perform minimum of 4 times prior to completion of sealant installation.
      c. Schedule tests at evenly-spaced intervals during sealant installation at discretion of sealant manufacturer.
   3. Procedure:
      a. Make knife cut through sealant from side to side of joint.
      b. At joint's sides, make two cuts approximately 2 inches long meeting cut made across joint width.
      c. Place a mark on cut portion of sealant 1 inch from cut across joint width.
      d. Use fingers to grasp 2 inch piece of sealant firmly between mark and cut across joint width.
      e. Pull cut portion outward at an angle of 90 degrees from sealant face.
      f. Use a ruler to measure distance that sealant is pulled.

g. Pull uncut sealant out of joint to distance recommended by manufacturer for testing adhesive capability, but not less than a distance equal to maximum movement capability in extension.
h. Hold extended sealant for a minimum of 10 seconds.
i. If adhesion is proper, sealant should tear cohesively in itself or be difficult to adhesively remove from joint substrate.

4. Summarize test results in test report. Indicate:
   a. Sealants tested.
   b. Joint substrates.
   c. Cohesive failures.
   d. Adhesive failures.
   e. Pull distance used.
   f. Actions to correct failures and non-complying conditions.
5. In absence of noncomplying conditions, sealants which do not indicate adhesive failure from testing will be considered satisfactory.
6. Replace sealant removed from test locations by applying sealant in accordance with manufacturer's requirements for applying sealant to previously sealed joints.

3.5 CLEANING

A. Clean excess sealants and sealant smears from adjacent surfaces as application progresses; comply with sealant manufacturer's requirements and manufacturer of surface in which joints occur.
B. Repair or replace defaced or disfigured finishes caused by work of this Section and replace where installation techniques result in unsatisfactory joining of materials and unsightly conditions.

3.6 PROTECTION

A. Protect in accordance with Section 017300.
B. Protect sealants from contamination until cured.
C. Protect sealant joints in horizontal surfaces from foot and vehicular traffic until cured.

3.7 SCHEDULE

A. Items Not to be Sealed:
   1. Joints, perimeter, and penetrations in fire-rated assemblies. Use firestopping specified in Section 078400.
   2. Joints, perimeter, and penetrations in sound-rated assemblies. Use acoustical sealant specified with sound-rated assembly in Section 092900.
B. Sealant Schedule:
   1. Exterior Locations:
      a. Wall Joints: Designation S-GP; use primer where required by manufacturer.
      b. Joints and Perimeter of Penetrations in Horizontal Pedestrian and Vehicle Traffic Surfaces: Designation U-TB.
   2. Interior Joints:
      a. Wall and Ceiling Joints subject to Movement: Designation S-GP.
      b. Wall and Ceiling Joints not subject to Movement: Designation AL.
      c. Interior side of exterior openings: S-GP.
      d. Floor Joints, including tile: Designation U-TB.
      e. Interior Sanitary Joints; Joints Between Plumbing Fixtures and Adjoining Floor, Wall, and Ceiling Surfaces; Joints Between Back Splashes and Wall Substrates: Designation S-S.

END OF SECTION

SECTION 081100
METAL FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes: Frames of hollow metal construction.
B. Related Sections:
   1. Section 081400 - Wood Doors.
   2. Section 087100 - Door Hardware.

1.2 SYSTEM DESCRIPTION

A. General:
   1. Meet or exceed ANSI/SDI 250.8 and HMMA 861, and more stringent requirements specified in this Section.
   2. Hardware Preparation:
   3. Comply with ANSI A115 Series and SDI 107, except for hardware locations.
   4. Comply with Section 087100 for hardware locations.
   5. Mortise, reinforce, drill, and tap frames and doors at factory to receive mortised and concealed hardware in accordance with templates and approved hardware schedules.
   6. Reinforce frames and doors for surface mounted hardware; drilling and tapping will be in field at time of hardware application.
   7. Comply with ANSI/SDI A250.8 and SDI 107 for thickness of hardware reinforcing.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data:
   1. Submit for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, profiles, and finishes.
   2. Include proof that doors and frames are fabricated in accordance with SDI requirements.
C. Shop Drawings:
   1. Submit schedule indicating opening identification number, door and frame types, sheet metal thickness, dimensions, swing, label, hardware requirements, and undercuts when applicable. Use same identification numbers for openings as shown by Contract Drawings.
   2. Include elevations and details indicating door and frame types, profiles, conditions at openings, methods of anchoring, hardware locations, reinforcement for hardware, core construction, and provisions for vision panels and louvers when applicable.
   3. Clearly identify work that cannot be permanently factory assembled before shipment. Indicate locations of field splice joints and include associated details to ensure proper assembly at project site.

1.4 DELIVER, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.
B. Store in protected dry area under cover.
C. Place units on wood skids and store in manner that will prevent corrosion and damage.
D. Avoid use of non-vented plastic or canvas coverings which could trap moisture.
E. Store assemblies upright, do not stack flat. Provide space between stacked assemblies to promote air circulation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Members of Steel Door Institute (SDI) or Hollow Metal Manufacturer's Association (HMMA).
   1. Amweld.
   2. Ceco.
   3. Curries.
   4. Pioneer.
   5. Republic.
   6. Steelcraft.

2.2 MATERIALS

A. Cold-Rolled Steel: ASTM A1008, commercial quality, Class 1, stretcher-leveled, matte finish.
B. Hot-Rolled Steel: ASTM A1011, commercial quality, pickled, and oiled.
C. Galvanized / Galvannealed Steel (Exterior Locations):
   1. Sheet: ASTM A653, A60 or G60 coating designation, zinc coated by hot-dip process, commercial quality, stretcher-leveled, mill phosphatized. WCGS not permitted.
   2. Anchors and Accessories: ASTM A879, minimum Class B coating, zinc coated by electro-deposition, commercial quality, mill phosphatized.
D. Anchor Bolts, Fasteners, and Screws: Manufacturer's standard type, except cadmium or zinc plated finish. Stainless steel also acceptable.
E. Primer: Manufacturer's standard rust inhibitive primer, air-dried or baked, compatible with finish painting specified in Section 099000.

2.3 FABRICATION

A. General:
   1. Except where specified or noted otherwise, fabricate frames, door faces and edges using cold-rolled steel. Concealed stiffeners, reinforcing, and other components may be cold-rolled or hot-rolled steel at fabricator's option.
   2. Fabricate frames, doors and related components using galvanized/galvannealed steel where assemblies have exposure to exterior atmosphere.
   3. Fabricate sheet metal work neat in appearance and free from defects, warps, or buckles.
   4. Accurately form metal to required sizes and profiles.
   5. Grind and dress exposed welds smooth and flush with adjacent surfaces.
   6. Remove tool marks and surface imperfections by dressing, filling, and sanding smooth. Do not use metallic filler to conceal manufacturing defects.
B. Edge Clearances:
   1. Between doors and frames at head and jambs: 1/8 inch.
   2. Between meeting stiles at pairs of doors: 1/8 inch.
   3. Between Bottom Edge of Door and Finish Floor at Non-Label Assemblies: In accordance with HMMA 861, ANSI/SDI A250.8 except where larger undercuts are scheduled. Finish floor is defined as top surface of substrate. Where carpet or other applied surface materials are placed over floor substrate and greater than 1/2 inch thickness, provide 1/4 inch clearance.
   4. Between Bottom Edge of Door and Threshold: 1/4 inch.

2.4 FABRICATION – FRAMES

A. General Requirements:
   1. Provide frames based on door grade and model in accordance with ANSI/SDI A250.8 and HMMA 820.

2. Welded construction required at exterior.
3. Fully face weld corners, including stops. Grind weld smooth with adjacent surfaces.
4. Fabricate exterior assemblies of 14 gage or 0.067 inch thick steel.
5. Fabricate interior assemblies of 16 gage or 0.053 inch thick steel for door openings 4'-0" or less in width, 14 gage or 0.067 inch thick steel for door openings over 4'-0" in width.
6. Corners of mitered design; stops coped and butted, or mitered.
7. Accurately cope joints of mullions, rails, and other similar tubular members; reinforce joints with concealed clips or sleeves.
8. Closed or tubular members may be fabricated of two pieces if interlocked at base of stops; visible seams or joints are not acceptable.

B. Guard Box:
1. Closed box design, 26 gage or 0.016 inch thick minimum, welded to frame.
2. Required at mortise hardware cutouts for assemblies installed within masonry walls or where assemblies will have frames grouted with mortar or similar materials at time of installation.

C. Spreader: Manufacturer's standard temporary channel or angles tack welded at bottom of jamb members.

D. Floor Anchor Clips:
1. Provide at each jamb and mullions which extend to floor.
2. In areas where concrete topping or other similar construction occurs, provide adjustable design to permit securing to depressed subfloor construction. In lieu of adjustable design, frames may extend to subfloor.

E. Jamb Anchors: Comply with SDI-111 and HMMA 820.
1. Masonry Walls: 3/16 inch diameter crimped galvanized wire or corrugated steel T-strap design. Locate near bottom of frame, near top of frame, and 32 inch centers maximum intermittently, minimum 3 per jamb.
2. Metal Stud Wall Systems: Steel clips welded to frame, type or design compatible with stud system. Locate at top of frame, 12 inch from top, and 24 inch centers maximum intermittently, minimum 4 per jamb.
3. Previously Placed Concrete, Masonry, or Structural Steel: Tension plate and spacer design, welded to frame at approximately 24 inch centers, minimum 3 per jamb. Frames drilled and countersunk for 1/4 inch flathead anchor bolts, set below frame surface.
4. Label Frames: Comply with fire testing agency label and listing requirements.

F. Silencers:
1. Drill or Punch Frames for Silencers. Coordinate hole size with silencers specified in Section 087100.
2. Single Interior Doors: 3 at strike jamb.
3. Weatherstripped doors: None required.
4. Sound, Light, or Smoke Sealed Doors: None required.

G. Glazing Beads:
1. Minimum 18 gage or 0.042 inch thick steel, screw-on type, corners butted or mitered, secure with countersunk oval head screws at 12 inch centers maximum, and factory installed prior to shipment.
2. Place glazing bead on interior or non-secure side of frame.
3. Coordinate dimensions for glazing rabbets with requirements of Section 088000.

2.5 FINISHES

A. Ferrous and Galvanized Steel Assemblies:
   1. Clean surfaces free of mil scale, rust, oil, grease, dirt, and other foreign materials.
   2. Phosphatize or chemically treat surfaces before application of prime coat finish.
   3. Touch-up areas where abrasions and welding have destroyed zinc coating with zinc-rich paint before application of prime coat finish.
   4. Prime Coat: Manufacturer’s standard rust inhibitive primer to produce smooth and uniform coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017300.

3.2 INSTALLATION

A. Install hollow metal assemblies in accordance with SDI 105 and HMMA 840.
B. Set frames plumb, level, in true alignment, securely fastened to floor with expansion shields and bolts, and fastened to adjoining walls with specified jamb anchors. Remove temporary spreaders and braces.
C. Install doors accurately in frames maintaining specified clearances. Install hardware in accordance with manufacturer's written instructions and associated templates. Refer to Section 087100 for hardware installation requirements.

3.3 ADJUSTMENTS

A. After installation of hardware, test and adjust doors for smooth operation.

END OF SECTION

SECTION 081400
WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
   1. Section 081100 - Metal Frames.
   2. Section 087100 - Door Hardware.
   3. Section 088000 - Glazing: Glass for vision panels.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data:
   1. Submit product data to indicate compliance with specified requirements.
   2. Include information for factory finishes.
C. Shop Drawings:
   1. Submit door schedule indicating opening identification number, door type, grade, size, thickness, swing, label requirements, and undercuts when applicable. Use same identification numbers as Contract Drawings.
   2. Include door elevations indicating type of construction, stile and rail requirements, hardware blocking, stile finishing, provisions for vision panels when applicable, and other pertinent data.
   3. Indicate prefitting and premachining requirements, including hardware locations.
   4. Detail full size sections of vision panel moldings.
D. Samples:
   1. Submit three 8 by 10 inches sample demonstrating expected color range for each wood veneer, stain, and finish combination.
E. Submit following Informational Submittals:
   1. Manufacturer’s instructions.
F. Closeout Submittals:
   1. Submit under provisions of Section 013300.
   2. Warranty.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Furnish each type of door from one manufacturer, unless otherwise acceptable to Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.
B. Protect during transit, storage and handling to prevent damage, soiling and deterioration.
C. Comply with manufacturer's instructions and AWS requirements for care and handling of doors.
D. Deliver to site after wet construction operations are completed and dry, and building has reached average prevailing relative humidity.
E. Deliver components in manufacturer's original unopened protective covering or container, clearly marked with manufacturer's name, brand name, and identifying door opening number on covering.
F. Storage:
   1. Store in clean, dry, well ventilated area protected from sunlight.
   2. Avoid extreme heat, cold, dryness or humidity.
   3. Store flat over level surface above floor on wood blocking.
   4. Under bottom door and over top of stack; furnish plywood or corrugated cardboard for protection.
G. Handling: Do not drag doors across one another or across other surfaces.

1.5 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Comply with manufacturer's written requirements under which products can be installed
   2. Condition doors to average prevailing humidity in installation area prior to hanging.

1.6 WARRANTY

A. Provide warranties in accordance with Section 013300.
B. Provide written warranty signed by official of door manufacturer, agreeing to repair or replace defective doors which have:
   1. Delamination in any degree.
   2. Warp or twist of 1/4 inch or more in any 42 by 84 inch plane of door face.
   3. Telegraphing of stile, rail or core through face to cause surface variation in excess of 1/100 inch in any 3 inch span.
C. Include hanging, installation of hardware and refinishing which may be required due to repair or replacement of defective doors.
D. Provide warranty for solid core doors for life of original installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable 5 Ply (PC-5) Door Manufacturers:
   1. Basis of Design: VT Industries – Eggers Division.
   2. Aspiro™ Series | Marshfield-Algoma by Masonite Architectural
   3. Approved Equal

2.2 MATERIALS

A. Face Veneer:
   1. WDMA/AWS quality standard Grade AA .
   2. Species: White birch.
   3. Cut: Plain sliced .
   4. Matching:
      a. Book match; center balanced.
      b. Sequence match sets for pairs of doors for continuity of veneer and appearance.
   5. Thickness: 0.020 inch minimum.
B. Particleboard Core:
   1. Quality: ANSI A208.1, Grade LD-2.
   2. Density Factor: 32 lbs/ft^3.
C. Comply with Cal-GREEN Table 5.504.4.5 - Formaldehyde Limits for composite wood and agri-fiber products.
D. Blocking: Provide composite blocking approved for use in doors of fire-protection ratings indicated as needed to maintain WDMA performance level and eliminate through-bolting hardware.
E. Adhesives: Type I waterproof and Type II water-resistant, product as recommended by door manufacturer.
F. Adhesives & Sealants: Only use adhesives and sealants that comply with VOC limits of the current requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168 and Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit, and Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

2.3 CABINETS

A. Manufacturer: Potter Roemer. Do not use JL Industries Cabinet.
B. Fire Extinguisher Cabinet:

1. Formed sheet metal 20 gage prime painted steel, epoxy finished interior.
2. Recessed type.
3. Cabinet Construction: Nonrated, except provide rated cabinet when recessed into rated partitions of same rating as partition.
4. Size to accommodate fire extinguisher and accessories.

C. Trim: Flat, stainless steel.

D. Door:
1. Material: Stainless steel.
2. Thickness: 20 gage minimum, reinforced for flatness and rigidity.
3. Latch: Lock, Potter Roemer LL24.
4. Door style: Break glass with lock or break rite handle.

E. Mounting Hardware: Appropriate to cabinet.

F. Graphic Identification: Red vertical letters on cabinet. Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.

2.4 FLUSH DOORS

A. General:
1. Provide doors in accordance with ANSI/WDMA I.S. 1A Industry Standard for Interior Architectural Wood Flush Doors, or *North American Architectural Woodwork Standards*, Section 9.
2. WDMA / NAAWS Quality Grade: Premium.
3. WDMA Performance Level: Heavy Duty.
4. Face: Wood Veneer
5. Door thickness: 1-3/4 inch thick.
6. Top and Bottom Rails: Structural composite lumber.
7. Vertical Edges (Stiles):
   a. Structural composite lumber, Solid, laminated, or veneered to match face veneer.
   b. Screw holding capacity: 600 lbf, ASTM D1037.
   c. Modified cleavage: 750 lbf, ASTM D143.
8. Crossband: 1/16 inch horizontal hardwood veneer or high-density hardboard.
9. Bonding Adhesive:
   a. Face Assembly: Type I, Type II for plastic laminate.
   b. Core Assembly: Type II.
10. Construction: Five plies; stiles and rails bonded to core, entire unit abrasive planed before veneering.

B. 5 Ply Door:
1. Quality Standard: AWS PC-5, premium grade.
2. Construction: Face material and crossband bonded to each side of core.
3. Face Material:
   a. Wood veneer.
   b. Thickness: 0.020 inch minimum.
4. Core: Particleboard, glued to stiles and rails.
5. Top and Bottom Rails: Structural composite lumber (SCL). Minimum 1-1/8 inch wide at top and bottom rail for typical doors. Minimum 5 inches wide at top rails, complying with WDMA requirements for HB-1 blocking options, for doors equipped with closers or other applied hardware.

2.5 ACCESSORIES

A. Vision Panel Molding: Hardwood, species to match face veneer.

B. Hardware: Refer to Section 087100.
   1. Campus Standard requires kick plates on all doors; restroom doors to have mop plates.

2.5 FABRICATION

A. General:
   1. Factory prefit to size ready for installation; trimming at Project site not permitted. Factory machine for mortised hardware.
   2. Prepare factory prefit and premachined assemblies in accordance with approved frame shop drawings, hardware schedule, and templates.
B. Fabricating Tolerances:
   1. Prefit size: Plus or minus 1/32 inch overall dimensions.
   2. Squareness: Length of diagonal measured on face of door from upper right corner to lower left corner between length of diagonal measured on upper left corner to lower right corner with maximum difference of 1/8 inch.
   3. Maximum warp: 1/4 inch in any 42 by 84 inch plane of door face.
   4. Show-through (telegraphing): 0.010 inch deviation from true plane in any 3 inch span on door frame.
C. Edge Clearance: Per WDMA I.S. 1A.
   1. Between doors and frames at head and jambs: 1/8 inch.
   2. Between meeting stiles at pairs of doors: 1/8 inch.
   3. Between bottom edge and finished floor: 1/2 inch, except where larger undercuts are scheduled at non-fire rated assemblies.
D. Stile Edge Treatment:
   1. Bevel strike stile of single doors and meeting stiles at pairs of doors 1/8 inch in 2 inches.
   2. Bevel hinge stile of fire doors 1/16 inch in 2 inches.
E. Machining for Hardware:
   1. Factory machine for hardware requiring mortising and routing.
   2. Machining not required for surface mounted hardware.
   3. Provide backing for door hardware such as closers; no thru-bolting allowed.
   4. Prepare in accordance with applicable ANSI A115-W Series, except for hardware locations.
   5. Prepare in accordance with templates and approved hardware schedule.
   6. Pilot drill screw and bolt holes.
   7. Locate hardware in accordance with requirements specified in Section 087100.
F. Vision Panels:
   1. Factory cut openings.
   2. For non-labeled doors, trim openings with hardwood moldings fixed one side, removable other side, and corners mitered.
   3. Locate panels where indicated; 6 inches minimum required between edge of cutout and door edge.
   4. Coordinate dimensions for glazing rabbets with requirements of Section 088000.

2.6 FINISHING

A. Comply with WDMA or NAAWS Section 5 for types of factory applied finish systems indicated.
B. WDMA TR-8 UV Cured Acrylated Polyester/Urethane, transparent finish:
   1. Quality Grade: Premium.
   2. Stain: To match sample.
   3. Degree of Sheen: Satin.
   4. Stain: Architect to select from manufacturer’s standard colors

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with Section 017300.
   1. Verify frames are properly sized and set square and true.

3.2 INSTALLATION

A. Install in accordance with Section 017300, approved shop drawings, and manufacturer's written instructions.
   1. Wood Doors: WDMA I.S. 1A
   2. Smoke and Draft Control Doors: NFPA 105
B. Install accurately in frame, within clearances specified. Install hardware in accordance with manufacturer's written instructions and associated templates. Refer to Section 087100 for general installation requirements.
C. Install doors to operate freely, but not loosely, free from hinge bound conditions, sticking, or binding. Do not install in frames which would hinder operation of doors.
D. Ensure doors are free from rattling when in latched position.

3.3 ADJUSTING

A. After installation of hardware, adjust and check each door to ensure proper operation and function.
B. Replace or rehang doors which are hinge bound and do not swing or operate freely.
C. Remove and replace doors which are warped, twisted or which are not in true planes.
D. Replace factory finished doors damaged during installation.

3.4 CLEANING AND PROTECTION

A. Protect finished work in accordance with Section 017400.
B. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish.

END OF SECTION

SECTION 083100
ACCESS DOORS AND PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Requirement of Products Covered Under This Section:
   1. Furnish and install access panels as required to access plumbing, fire protection, mechanical and electrical work as necessary for operation and maintenance of concealed equipment, valves, cleanouts, controls, and other similar devices requiring access.
   2. Coordinate requirements with Divisions 21, 22, 23, and 26.

B. Related Sections:
   1. Section 087100 - Door Hardware: Keyed cylinders.
   2. Section 090000 - Painting: Field paint finish.
   3. Division 22 – Plumbing: Coordinate access panel location.
   4. Division 23 – Heating, Ventilating, and Air Conditioning: Coordinate access panel location.
   5. Division 26 – Electrical: Coordinate access panel location.

1.2 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Provide stainless steel units at toilet rooms.
   2. Determine specific locations and sizes for access doors and panels needed to gain access to concealed equipment, and indicate on schedule specified under “Submittals” Article.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data: Submit product data for each type of access panel.
C. Shop Drawings: Include complete schedule indicating types, locations, sizes, wall and ceiling construction details, latching and locking provisions, and other pertinent data.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer to ensure quality of appearance and performance.
B. Fire-Resistance Ratings: Appropriate UL or Warnock Hersey label required on fire rated assemblies.
C. Size Variations: Obtain Architect's acceptance of manufacturer's standard size units which may vary from sizes indicated on Drawings.
D. Coordination: Furnish inserts and anchoring devices which required to be built into other work for installation of access panels. Coordinate delivery with other work to avoid delay.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Steel Manufacturers:
   1. Bauco Access Panel Solutions Inc.
   2. J. L. Industries, Bloomington, MN.
   3. Karp Associates, Inc., Maspeth, NY.
   4. Milcor Incorporated, Lima, OH.
   5. Nystrom Products Company, Minneapolis, MN.
   6. The Williams Brothers Corporation of America, Front Royal, VA

7. Or equal.

2.2 MATERIALS AND FABRICATION

A. Steel Assemblies: Fabricate of sheet steel complying with ASTM A1008.
B. Stainless Steel Assemblies: Fabricate of sheet stainless steel complying with ASTM A167, Type 304 with No. 4 finish for toilet room walls.
C. Frames:
   1. Fabricate with casing bead welded to perimeter of frame for assemblies installed in gypsum board surfaces.
   2. Fabricate of not less than 16 gage materials.
   3. Fabricate with exposed flange of nominal 1 inch wide around perimeter for assemblies installed in following construction:
      a. Exposed masonry or concrete.
      b. Ceramic tile.
      c. Suspended ceiling, acoustical tile.
D. Non-Rated Flush Panels: Typical locations. Fabricate of not less than 14 gage sheet materials with integral frame. Equip with concealed spring hinges or concealed continuous piano hinge designed to open 175 degree minimum.
E. Equip with concealed spring hinges or concealed hinges and cam latches Locking Devices: Provide key controlled locking device for each assembly. Key all locks alike, unless directed otherwise. Furnish 6 keys.

2.3 FINISH

A. Steel Assemblies:
   1. Clean surfaces free of mil scale, rust, oil, grease, dirt, and other foreign materials.
   2. Phosphatize or chemically treat surfaces before application of prime coat finish.
   3. Apply rust inhibitive primer to produce uniform smooth coat at 2.0 mils minimum dry film thickness.
B. Stainless Steel Assemblies:
   1. No. 4 finish complying with NAAMM AMP503, vertical grain.
   2. Protect finish with factory applied adhesive backed paper covering.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017300.
B. Verify rough openings are correctly located, sized and prepared for installation.

3.2 INSTALLATION

A. Install plumb, level, square and rigidly secured in accordance with Section 017300.
B. Position for convenient access to concealed work requiring access.

3.3 ADJUSTMENTS

A. After installation, test and adjust panels and hardware for smooth operation.

END OF SECTION

SECTION 084113
ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Entrance and storefront systems, complete with reinforcing, sill extrusions, fasteners, anchors, and attachment devices.
   2. Aluminum doors complete with hardware.
   3. Accessories necessary to complete work.

B. Related Sections:
   1. Section 079200 - Joint Sealants: Perimeter sealants and backup materials.
   2. Section 087100 - Door Hardware: Keyed cylinders.
   3. Section 088000 - Glass and Glazing.

1.2 SYSTEM REQUIREMENTS

A. General: In addition to requirements shown or specified, comply with design requirements of Sections 013340 and 088000.

B. Design Requirements:
   1. Manufacturer is responsible for designing system, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
   2. Employ registered professional engineer, licensed to practice structural engineering in jurisdiction where Project is located, to engineer each component of storefront system. Refer to Section 013340.
   3. Drawings are diagrammatic and do not purport to identify nor solve problems of thermal or structural movement, glazing, anchorage, or moisture disposal.
   4. Requirements shown by details are intended to establish basic dimension of units, sight lines and profiles of members.
   5. Provide concealed fastening wherever possible.
   6. Provide entrance and storefront systems, including necessary modifications, to meet specified requirements and maintaining visual design concepts.
   7. Attachment considerations are to take into account site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening or fracturing connection between units and building structure or between units themselves.
   8. Anchors, fasteners and braces shall be structurally stressed not more than 50 percent of allowable stress when maximum loads are applied.
   9. Provide for expansion and contraction due to structural movement without detriment to appearance or performance.
   10. Assemblies shall be free from rattles, wind whistles and noise due to thermal and structural movement and wind pressure.

C. Performance Requirements:
   1. Limit air leakage through assembly to 0.06 CFM/min/sq. ft. (.00003 m^3/sm^2) of wall area at 6.24 PSF (300 Pa) as measured in accordance with ASTM E283.
   2. Water Resistance: No water leakage when measured in accordance with ASTM E331 with a static test pressure of 15PSF.
   3. Dynamic Water Resistance: No water leakage, when measured in accordance with AAMA 501.1-94 with a dynamic test pressure of 15PSF.

4. Uniform Load Deflection under ( ) psf positive and ( ) psf negative design wind pressure normal to the plane of the wall, shall not exceed L/175 of the clear span or 3/4", when tested in accordance with ASTM E 330.
5. Uniform Load Structural at a pressure 1.5 times the design wind pressure in accordance with ASTM E 330.
6. System shall not deflect more than 1/8" at the center point, or 1/16" at the center point of a horizontal member, once deadload points have been established.
7. System shall accommodate expansion and contraction movement due to surface temperature differential of 180 degrees F.
8. Condensation Resistance Factor (CRF) in accordance with AAMA 1503.1-88 shall not be less than 55.
9. Thermal Transmittance (U-Value) in accordance with AAMA 1503.1-88 shall not be more than .65 BTU,hr/degree F/SF.
10. Seismic testing shall conform to AAMA recommended static test method for evaluating performance of curtain walls and storefront wall systems due to horizontal displacements associated with seismic movements and building sway.
11. Sound transmission in accordance with ASTM E 90.
12. National Fenestration Rating Council (NFRC) specific application evaluation.

D. Testing Requirements: Provide components that have been previously tested by an independent testing laboratory.

E. Interface With Adjacent Systems:
   1. Integrate design and connections with adjacent construction.
   2. Accommodate allowable tolerances and deflections for structural members in installation.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data:
   1. Submit product data for storefront system.
   2. Include information for factory finishes, hardware, accessories and other required components.

C. Shop Drawings:
   1. Submit shop drawings created by storefront manufacturer covering fabrication, installation, and finish of specified systems.
   2. Stamp shop drawings with seal and signature of professional engineer responsible for design. Refer to Section 013340.
   3. Include following:

      Fully dimensioned plans and elevations with detail coordination keys.

      Locations of exposed fasteners and joints.
   4. Provide Detailed Drawings of:
      a. Composite members.
      b. Joint connections for framing systems and for entrance doors.
      c. Anchorage.
      d. System reinforcements.
      e. Drainage patterns and sill extrusions.
      f. Expansion and contraction provisions.
      g. Hardware, including locations, mounting heights, reinforcements and special installation provisions.
      h. Glazing methods and accessories.

i. Internal sealant requirements and recommended types.
j. Thermal breaks.

5. Schedule of finishes.

D. Samples:
1. Submit samples indicating quality of finish on alloys used for work, 12 inches long for extrusions and 6 inches square for sheet materials.
2. Where normal texture or color variations are expected, include additional samples illustrating range of variation.

E. Submit following Informational Submittals:
1. Test Reports:
a. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting. Include other supportive data as necessary.
2. Support reactions design data.
3. Certifications specified in Quality Assurance article.
4. Qualification Data: Manufacturer's, engineer's, and installer's qualification data.
5. Manufacturer's installation instructions.

F. Closeout Submittals:
1. Submit under provisions of Section 017700.
2. Warranty: Submit specified warranty.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility:
1.5 To ensure quality of appearance and performance, obtain materials for systems from either a single manufacturer or from manufacturer approved by systems manufacturer.

B. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering in jurisdiction where Project is located, with minimum of 5 years experience in design of storefront systems.

C. Installer Qualifications: Certified in writing by system manufacturer as qualified for installation of specified systems.

D. Certifications:
1. Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements.
2. Submit manufacturer's certificate stating that sealed insulating glass meet or exceed specified requirements.
3. Submit coating manufacturer's certification stating fluoropolymer coating formulation is fluorosurfactant complying.
4. Engineering certifications.

1.5 MOCK-UPS

A. General: Comply with provisions of Section 014500.

B. Locate where directed by Architect to show intersection and transition of adjacent materials.

1.6 DELIVER, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

B. Protect finished surfaces as necessary to prevent damage.

C. Do not use adhesive papers or sprayed coatings which become firmly bonded when exposed to sun.

D. Do not leave coating residue on any surfaces.

E. Replace damaged units.

1.7 WARRANTY

A. Provide warranties in accordance with Section 017700.
B. Provide written warranty jointly signed by manufacturer, installer and Contractor agreeing to repair and/or replace assemblies which fail in material or workmanship during warranty period of 2 years from date of Substantial Completion.
C. Provide written warranty stating organic coating finish will be free from fading more than 10 percent, chalking, yellowing, peeling, cracking, pitting, corroding or non-uniformity of color, or gloss deterioration beyond manufacturer's descriptive standards for 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Entrance and Storefront: Arcadia, Inc., Vernon, CA.
B. Other Acceptable Manufacturers:
    1. EFCO Corporation, Monett, MO.
    2. Kawneer Company, Inc., Norcross, GA.
    3. Oldcastle Building Envelope, Santa Monica, CA.
    4. Or equal.

2.2 FRAMING MATERIALS AND ACCESSORIES

A. Aluminum:
    1. ASTM B221, alloy 6063-T5 for extrusions; ASTM B209, alloy 5005-H16 for sheets; or other alloys and temper recommended by manufacturer appropriate for specified finish.
    2. Minimum thickness of 0.125 inch for framing members and rails, 0.090 inch for sheets, and 0.050 inch for glazing stops and similar components.
B. Internal Reinforcing:
    1. ASTM A36 for carbon steel; or ASTM B308 for structural aluminum.
    2. Shapes and sizes to suit installation.
    3. Steel components factory coated with alkyd type zinc chromate primer complying with FS TT-P-645, applied after fabrication.
C. Anchorage Devices:
    1. Manufacturer's standard formed or fabricated steel or aluminum assemblies of shapes, plates, bars or tubes.
    2. Hot-dip galvanize steel assemblies after fabrication, comply with ASTM A123, 2.0 ounce minimum coating.
    3. Self-Drilling, Self-tapping Fasteners: Elco Dril-Flex with Stalgard Finish; no substitutions.
D. Fasteners:
    1. Aluminum, non-magnetic stainless steel or other non-corrosive materials compatible with items being fastened.
    2. Provide concealed fasteners wherever possible.
    3. For exposed locations, provide Phillips flathead screws with finish matching item fastened.
    4. For concealed locations, provide manufacturer's standard fasteners.
E. Self-Drilling, Self-tapping Fasteners: Elco Dril-Flex with Stalgard Finish; no substitutions.
F. Protective Coatings: Cold-applied asphalt mastic complying with SSPC-Paint 12, compounded for 30 mil thickness for each coat; or alkyd type zinc chromate primer complying with FS TT-P-645.
G. Touch-Up Primer for Galvanized Components: Zinc oxide conforming with FS TT-P-641.
H. Glazing Gaskets:

1. Compression type design, replaceable, molded or extruded, of neoprene, polyvinyl chloride (PVC), or ethylene propylene diene monomer (EPDM).
2. Conform to ASTM C509 or C864.
3. Profile and hardness as required to maintain uniform pressure for watertight seal.

I. Weatherstripping:
1. Wool pile conforming to AAMA 701.2; or extruded elastomeric conforming to ASTM C509 or C864.
2. Provide EPDM or vinyl-blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

J. Internal Sealants and Baffles: Types recommended by systems manufacturer.

2.3 DOOR HARDWARE

A. Hardware Items: Refer to Door Schedule and Sets

2.4 FABRICATION

A. Coordination of Fabrication:
1. Check actual frame or door openings required in construction work by accurate field measurements before fabrication.
2. Fabricate units to withstand loads which will be applied when system is in place.

B. General:
1. Provide each unit of framework continuous.
2. Disassemble only to extent necessary for shipment and installation.
3. Conceal fasteners wherever possible.
4. Reinforce work as necessary for performance requirements, and for support to structure.
5. Separate dissimilar metals and aluminum in contact with concrete utilizing protective coating or preformed separators which will prevent contact and corrosion.
6. Comply with Section 088000 for glazing requirements.

C. Aluminum Framing:
1. Provide members of size, shape and profile indicated, designed to provide for glazing from exterior.
2. Provide manufacturer's standard thermal isolation between exterior and interior aluminum extrusions.
3. Fabricate frame assemblies with mitered or coped joints.
4. Reinforce to develop full strength and maximum rigidity in framework.
5. Reinforce internally with structural members as necessary to support design loads.
6. Maintain accurate relation of planes and angles, with hairline fit of contacting members.
7. Seal horizontals and direct moisture accumulation to exterior.
8. Provide flashings and other materials used internally or externally that are corrosive resistant, non-staining, non-bleeding and compatible with adjoining materials.
9. Fabricate framing for expansion and contraction due to temperature changes without detrimental to appearance or performance.
10. Make provisions in framing for minimum edge clearance, nominal edge cover and nominal pocket width for thickness and type of glazing or infill used in accordance with recommendations of manufacturer and GANA Glazing Manual.

D. Entrance Doors:
1. Standard wide stile (6”) with manufacturer's standard features except provide 10 inch high bottom rail.

E. Hardware:

1. Receive hardware supplied in accordance with Section 087100 and install in accordance with requirements of this Section.
2. Cut, reinforce, drill and tap frames and doors as required to receive hardware.
3. Comply with hardware manufacturer's templates and instructions.
4. Use concealed fasteners wherever possible.

F. Welding:
1. Comply with recommendations of the American Welding Society.
2. Use recommended electrodes and methods to avoid distortion and discoloration.
3. Grind exposed welds smooth and flush with adjacent surfaces; restore mechanical finish.

2.5 FINISH

A. Color Anodized: Architect to select from Manufacturer’s standard options.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work when substrate conditions are acceptable.

3.2 INSTALLATION

A. Erection Tolerances:
1. Limit Variations from Plumb and Level:
2. 1/8 inch in 10'-0" vertically.
3. 1/8 inch in 20'-0" horizontally.
4. Limit Variations from Theoretical Locations: 1/4 inch for any member at any location.
5. Limit Offsets in Theoretical End-To-End and Edge-To-Edge Alignment: 1/16 inch from flush surfaces not more than 2 inches apart or out-of-flush by more than 1/4 inch.

B. Set units plumb, level and true to line, without warp or rack of frame.

C. Anchor securely in place, allowing for required movement, including expansion and contraction.

D. Separate dissimilar materials at contact points, including metal in contact with masonry or concrete surfaces, with bituminous paint or preformed separators to prevent contact and corrosion.

E. Set sill members in bed of sealant. Set other members with internal sealants and baffles to provide weathertight construction.

F. Install doors and hardware in accordance with manufacturer's printed instructions.

3.3 FIELD QUALITY CONTROL

A. Site Tests: Comply with requirements of Section 088000.

B. Perform Hose Test in accordance with Section 088000.

3.4 ADJUSTING

A. Test Door Operating Functions. Adjust closing and latching speeds and other hardware in accordance with manufacturer's instructions to ensure smooth operation.

3.5 CLEANING

A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.

B. Clean metal surfaces exercising care to avoid damage.

END OF SECTION

SECTION 087100
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Door hardware, including electric hardware.
   2. Storefront and entrance door hardware.
   3. Power supplies for electric hardware.
   4. Low energy door operators plus sensors and actuators.
   5. Cylinders for doors fabricated with locking hardware.

B. Related Sections:
   1. Division 06 – door hardware installation
   2. Division 07 – sealant at exterior thresholds
   3. Division 08 – metal doors and frames, interior aluminum frames, wood doors, integrated security systems, specialty doors, storefront and glazed curtainwall systems.
   4. Division 10 – operable partitions
   5. Division 21 – fire and life safety systems
   6. Division 28 – security access systems

C. Specific Omissions: Hardware for the following is specified or indicated elsewhere.
   1. Windows.
   2. Cabinets, including open wall shelving and locks.
   3. Signs, except where scheduled.
   4. Toilet accessories, including grab bars.
   5. Installation.
   6. Rough hardware.
   7. Conduit, junction boxes & wiring.
   8. Folding partitions, except cylinders where detailed.
   9. Sliding aluminum doors, except cylinders where detailed.
   10. Access doors and panels, except cylinders where detailed.
   11. Corner Guards.
   12. Welded steel gates and supports.

1.2 REFERENCES

A. Use date of standard in effect as of Bid date.
   1. American National Standards Institute
      a. ANSI 156.18 – Materials and Finishes.
   2. BHMA – Builders Hardware Manufacturers Association
   3. 2022 California Building Code
      a. Chapter 11B – Accessibility To Public Buildings, Public Accommodations, Commercial Buildings and Public Housing
   4. DHI – Door and Hardware Institute
   5. NFPA – National Fire Protection Association
      a. NFPA 80 2022 Edition – Standard for Fire Doors and Other Opening Protectives.
      b. NFPA 105 – Smoke and Draft Control Door Assemblies
      c. NFPA 252 – Fire Tests of Door Assemblies
   6. UL – Underwriters Laboratories
      a. UL10C – Positive Pressure Fire Tests of Door Assemblies.
      b. UL 305 – Panic Hardware
   7. WHI – Warnock Hersey Incorporated State of California Building Code

8. Local applicable codes
9. SDI – Steel Door Institute
10. WI – Woodwork Institute
11. AWI – Architectural Woodwork Institute
12. NAAMM – National Association of Architectural Metal Manufacturers

B. Abbreviations
1. Manufacturers**:** see table at 2.1.A of this section
2. Finishes**:** see 2.7 of this section.

1.3 SUBMITTALS

A. SUBMITTALS**:** Submit six copies of schedule per Section 01330. Only submittals printed one sided will be accepted and reviewed. Organize vertically formatted schedule into “Hardware Sets” with index of doors and headings, indicating complete designations of every item required for each door or opening. Minimum 10pt font size. Include following information**:**
1. Type, style, function, size, quantity and finish of hardware items.
2. Use BHMA Finish codes per ANSI A156.18.
3. Name, part number and manufacturer of each item.
4. Fastenings and other pertinent information.
5. Location of hardware set coordinated with floor plans and door schedule.
6. Explanation of abbreviations, symbols, and codes contained in schedule.
7. Mounting locations for hardware.
8. Door and frame sizes, materials and degrees of swing.
9. List of manufacturers used and their nearest representative with address and phone number.
10. Catalog cuts.
11. Manufacturer’s technical data and installation instructions for electronic hardware.

B. Bid and submit manufacturer’s updated/improved item if scheduled item is discontinued.

C. Deviations**:** Highlight, encircle or otherwise identify deviations from “Schedule of Finish Hardware” on submittal with notations clearly designating those portions as deviating from this section.

D. If discrepancy between drawings and scheduled material in this section, bid the more expensive of the two choices, note the discrepancy in the submittal and request direction from Architect for resolution.

E. Substitutions per Division 1. Include product data and indicate benefit to the Project. Furnish operating samples on request.

F. (Verify! Do not include unless true! Delete if no subs listed at all) Items listed with no substitute manufacturers have been requested by Owner to meet existing standard.

G. Furnish as-built/as-installed schedule with closeout documents, including keying schedule, riser and point-to-point wiring diagrams, manufacturers’ installation, adjustment and maintenance information, and supplier’s final inspection report.

1.4 QUALITY ASSURANCE

A. Qualifications:
1. Hardware supplier: direct factory contract supplier who employs a certified architectural hardware consultant (AHC), available at reasonable times during course of work for project hardware consultation to Owner, Architect and Contractor.
a. Responsible for detailing, scheduling and ordering of finish hardware. Detailing implies that the submitted schedule of hardware is correct and complete for the intended function and performance of the openings.

B. Hardware: Free of defects, blemishes and excessive play. Obtain each kind of hardware (latch and locksets, exit devices, hinges and closers) from one manufacturer.
C. Exit Doors: Operable from inside with single motion without the use of a key or special knowledge or effort.
D. Fire-Rated Openings: NFPA 80 compliant. Hardware UL10C (positive pressure) compliant for given type/size opening and degree of label. Provide proper latching hardware, non-flaming door closers, approved-bearing hinges, and resilient seals. Coordinate with wood door section for required intumescent seals. Furnish openings complete.
E. Furnish hardware items required to complete the work in accordance with specified performance level and design intent, complying with manufacturers' instructions and code requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: coordinate delivery to appropriate locations (shop or field).
   1. Permanent keys and cores: secured delivery direct to Owner's representative.
B. Acceptance at Site: Items individually packaged in manufacturers' original containers, complete with proper fasteners and related pieces. Clearly mark packages to indicate contents, locations in hardware schedule and door numbers.
C. Storage: Provide securely locked storage area for hardware, protect from moisture, sunlight, paint, chemicals, dust, excessive heat and cold, etc.

1.6 PROJECT CONDITIONS

A. Where exact types of hardware specified are not adaptable to finished shape or size of members requiring hardware, provide suitable types having as nearly as practical the same operation and quality as type specified, subject to Architect's approval.
B. Coordination**:** Coordinate hardware with other work. Furnish hardware items of proper design for use on doors and frames of the thickness, profile, swing, security and similar requirements indicated, as necessary for proper installation and function, regardless of omissions or conflicts in the information on the Contract Documents. Furnish related trades with the following information**:**
   1. Location of embedded and attached items to concrete.
   2. Location of wall-mounted hardware, including wall stops.
   3. Location of finish floor materials and floor-mounted hardware.
   4. At masonry construction, coordinate with the anchoring and hollow metal supplier prior to frame installation by placing a strip of insulation, wood, or foam, on the back of the hollow metal frame behind the rabbet section for continuous hinges, as well as at rim panic hardware strike locations, silencers, coordinators, and door closer arm locations. When the frame is grouted in place, the backing will allow drilling and tapping without dulling or breaking the installer's bits.
   5. Locations for conduit and raceways as needed for electrical, electronic and electro-pneumatic hardware items. Fire/life-safety system interfacing. Point-to-point wiring diagrams plus riser diagrams to related trades.
   6. Coordinate: low-voltage power supply locations.
   7. Coordinate: back-up power for doors with automatic operators.
   8. Coordinate: flush top rails of doors at outswinging exteriors, and throughout where adhesive-mounted seals occur.
   9. Manufacturers' templates to door and frame fabricators.
C. Check Shop Drawings for doors and entrances to confirm that adequate provisions will be made for proper hardware installation.
D. Environmental considerations**:** segregate unused recyclable paper and paper product packaging, uninstalled metals, and plastics, and have these sent to a recycling center.

1.7 WARRANTY

A. Part of respective manufacturers' regular terms of sale. Provide manufacturers' written warranties.
B. Include factory order numbers with close-out documents to validate warranty information, required for Owner in making future warranty claims:
C. Minimum warranties:

1.	Locksets:	Three years
2.	Exit Devices:	Three years mechanical One year electrical
3.	Closers:	Thirty years mechanical Two years electrical
4.	Hinges:	One year
5.	Other Hardware	Two years

1.8 COMMISSIONING

A. Conduct these tests prior to request for certificate of substantial completion:
   1. With installer present, test door hardware operation with climate control system and stairwell pressurization system both at rest and while in full operation.
   2. With installer, access control contractor and electrical contractor present, test electrical, electronic and electro-pneumatic hardware systems for satisfactory operation.
   3. With installer and electrical contractor present, test hardware interfaced with fire/life-safety system for proper operation and release.

1.9 REGULATORY REQUIREMENTS

A. Locate latching hardware between 34 inches to 44 inches above the finished floor, per 2022 California Building Code, Section 11B-404.2.7.
   1. Panic hardware: locate between 36 inches to 44 inches above the finished floor.
B. Handles, pull, latches, locks, other operable parts:
   1. Readily openable from egress side with one hand and without tight grasping, tight pinching, or twisting of the wrist to operate. 2022 California Building Code Section 11B-309.4.
   2. Force required to activate the operable parts: 5.0 pounds maximum, per 2022 California Building Code Section 11B-309.4.
C. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2022 California Building Code Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.
   1. Exception: exterior doors' pressure-to-open may be increased to 8.5-pounds if: at a single location, and one of a bank of eight leafs or fraction of eight, and one leaf of this bank is fitted with a low- or high-energy operator.
D. Low-energy powered doors: comply with ANSI/BHMA A156.19. Reference: 2022 California Building Code Section 11B-404.2.9, Exception 2.
   1. Where powered door serves an occupancy of 100 or more, provide back-up battery power or stand-by generator power, capable of supporting a minimum of 100 cycles.
   2. Actuators, vertical bar type: minimum 2-inches wide, 30-inches high, bottom located minimum 5-inches above floor or ground, top located minimum 35-inches above floor or ground. Displays International Symbol of Accessibility, per 2022 California Building Code Section 11B-703.7.

3. Actuators, plate type: use two at each side of the opening. Minimum 4-inches diameter or 4-inches square. Displays International Symbol of Accessibility, per 2022 California Building Code Section 11B-703.7. Locate centerline of lower plate between 7- and 8-inches above floor or ground, and upper plate between 30- and 44-inches above floor or ground.
4. Actuator location: conspicuously located, clear and level floor/ground space for forward or parallel approach.

E. Adjust door closer sweep periods so that from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the landing side of the door, per 2022 California Building Code Section 11B-404.2.7.
1. Spring hinges: adjust for 1.5 seconds minimum for 70 degrees to fully-closed.

F. Smooth surfaces at bottom 10 inches of push sides of doors, facilitating push-open with wheelchair footrests, per 2022 California Building Code Section 11B-404.2.10.
1. Applied kickplates and armor plates: bevel the left and right edges; free of sharp or abrasive edges.
2. Tempered glass doors without stiles: bottom rail may be less than 10 inches if top leading edge is tapered 60 degrees minimum.

G. Door opening clear width no less than 32 inches, measured from face of frame stop, or edge of inactive leaf of pair of doors, to door face with door opened to 90 degrees. Hardware projection not a factor in clear width if located above 30 inches and below 80 inches, and the hardware projects no more than 4 inches. 2022 California Building Code Section 11B-404.2.3.
1. Exception: doors not requiring full passage through the opening, that is, to spaces less than 24 inches in depth, may have the clear opening width reduced to 20 inches. Example: shallow closets.
2. Door closers and overhead stops: not less than 78 inches above the finished floor or ground, per 2022 California Building Code 11B-307.4.

H. Thresholds**:** floor or landing no more than 0.50 inches below the top of the threshold of the doorway, per 2022 California Building Code Section 11B-404.2.5. Vertical rise no more than 0.25 inches, change in level between 0.25 inches and 0.50 inches**:** beveled to slope no greater than 1**:**2 (50 percent slope). 2022 California Building Code Section 11B-303.2 & ~.3.

I. Floor stops**:** Do not locate in path of travel. Locate no more than 4 inches from walls, per DSA Policy #99-08 (Access).

J. Pairs of doors with independently-activated hardware both leafs**:** limit swing of right-hand or right-hand-reverse leaf to 90 degrees to protect persons reading wall-mounted tactile signage, per 2022 California Building Code Section 11B-703.4.2.

K. Door and door hardware encroachment**:** when door is swung fully-open into means-of-egress path, the door may not encroach/project more than 7 inches into the required exit width, with the exception of door release hardware such as lockset levers or panic hardware. These hardware items must be located no less than 34-inches and no more than 48-inches above the floor/ground. 2022 California Building Code, Section 1005.7.1.

PART 2 - PRODUCTS

2.1 MANUFACTURERS:

A. Manufacturers and their abbreviations used in this schedule:

GLY	Glynn-Johnson Hardware
IVE	H. B. Ives
LCN	LCN Closers
SCE	Schlage Electronics
SCH	Schlage Lock Company
VON	Von Duprin
ZER	Zero International

2.2 HINGING METHODS

A. Drawings typically depict doors at 90 degrees, doors will actually swing to maximum allowable. Use wide-throw conventional or continuous hinges as needed up to 8 inches in width to allow door to stand parallel to wall for true 180-degree opening. Advise architect if 8-inch width is insufficient.

B. Conform to manufacturer's published hinge selection standard for door dimensions, weight and frequency, and to hinge selection as scheduled. Where manufacturer's standard exceeds the scheduled product, furnish the heavier of the two choices, notify Architect of deviation from scheduled hardware.

C. Conventional Hinges: Steel or stainless-steel pins and approved bearings. Hinge open widths minimum, but of sufficient throw to permit maximum door swing.
   1. Outswinging exterior doors: non-ferrous with non-removable (NRP) pins and security studs.
   2. Non-ferrous material exteriors and at doors subject to corrosive atmospheric conditions.

D. Continuous Hinges:
   1. Geared-type aluminum.
      a. Use wide-throw units where needed for maximum degree of swing, advise architect if commonly available hinges are insufficient.
      b. If units are used at storefront openings, color-coordinate hinge finish with storefront color. Custom anodizing and custom powdercoat finishes subject to Architect approval.

2.3 LOCKSETS, LATCHSETS, DEADBOLTS:

A. Mortise Locksets and Latchsets: as scheduled.
   1. Chassis: cold-rolled steel, handing field-changeable without disassembly.
   2. Universal lock case – 10 functions in one case.
   3. Floating mounting tabs automatically adjusts to fit a beveled door edge.
   4. Latchbolts: 0.75 inch throw stainless steel anti-friction type.
   5. Lever Trim: through-bolted, accessible design, cast lever or solid extruded bar type levers as scheduled. Filled hollow tube design unacceptable.
      a. Spindles: security design independent breakaway. Breakage of outside lever does not allow access to inside lever's hubworks to gain wrongful entry.
      b. Inside lever applied by screwless shank mounting – no exposed trim mount screws.
      c. Levers rotate up or down for ease of use.
      d. Vandalgard locks: locked lever freely rotates down while remaining securely locked. This feature prevents damage to internal lock components when subjected to excessive force.
   6. Furnish solid cylinder collars with wave springs. Wall of collar to cover rim of mortise cylinder.

7. Turnpieces: accessible offset turn-lever design not requiring pinching or twisting motions to operate.
8. Deadbolts: stainless steel 1-inch throw.
9. Electric operation: Manufacturer-installed continuous duty solenoid.
10. Strikes: 16 gage curved steel, bronze or brass with 1 inch deep box construction, lips of sufficient length to clear trim and protect clothing.
11. Scheduled Lock Series and Design: Schlage L series, 06A design.
12. Certifications:
    a. ANSI A156.13, 1994, Grade 1 Operational, Grade 1 Security.
    b. ANSI/ASTM F476-84 Grade 31 UL Listed.
13. Accessibility: Require not more than 5 lb to retract the latchbolt or deadbolt, or both, per CBC 2022 11B-404.2.7 and 11B-309.4.

2.4 EXIT DEVICES / PANIC HARDWARE

A. General features:
   1. Independent lab-tested 1,000,000 cycles.
   2. Push-through push-pad design. No exposed push-pad fasteners, no exposed cavities when operated. Return stroke fluid dampeners and rubber bottoming dampeners, plus anti-rattle devices.
   3. Deadlocking latchbolts, 0.75 inch projection.
   4. End caps: impact-resistant, flush-mounted. No raised edges or lips to catch carts or other equipment.
   5. No exposed screws to show through glass doors.
   6. Non-handed basic device design with center case interchangeable with all functions, no extra parts required to effect change of function.
   7. Releasable in normal operation with 15-pound maximum operating force per UBC Standard 10-4, and with 32-pound maximum pressure under 250-pound load to the door.
   8. Exterior doors scheduled with XP-series devices: Static load force resistance of at least 2000 pounds.
   9. Accessibility: Require not more than 5 lb to retract the latchbolt, per CBC 2022 11B-404.2.7 and 11B-309.4.
      a. Mechanical method: Von Duprin “AX-“ feature, where touchpad directly retracts the latchbolt with 5 lb or less of force. Provide testing lab certification confirming that the mechanical device is independent third-party tested to meet this 5 lb requirement.
      b. Electrical method: Von Duprin’s “RX-QEL-“, where lightly pressing the touchpad with 5 lb or less of force closes an electric switch, activating quiet electric latch retraction.

B. Specific features:
   1. Non-Fire Rated Devices: cylinder dogging.
   2. Lever Trim: breakaway type, forged brass or bronze escutcheon min. 0.130 inch thickness, compression spring drive, match lockset lever design.
   3. Rod and latch guards with sloped full-width kickplates for doors fitted with surface vertical rod devices with bottom latches.
   4. Fire-Labeled Devices: UL label indicating “Fire Exit Hardware”. Vertical rod devices less bottom rod (LBR) unless otherwise scheduled.
   5. Electrically Operated Devices: Single manufacturer source for electric latch retraction devices, electrically controlled trim, power transfers, power supplies, monitoring switches and controls.

2.5 CLOSERS

A. Surface Closers: (4040XP)
   1. Full rack-and-pinion type cylinder with removable non-ferrous cover and cast iron body. Double heat-treated pinion shaft, single piece forged piston, chrome-silicon steel spring.
   2. ISO 2000 certified. Units stamped with date-of-manufacture code.
   3. Independent lab-tested 10,000,000 cycles.
   4. Non-sized, non-handed, and adjustable. Place closer inside building, stairs, and rooms.
   5. Plates, brackets and special templating when needed for interface with particular header, door and wall conditions and neighboring hardware.
   6. Adjust doors to open with not more than 5.0-pounds pressure to open at exterior doors and 5.0-pounds at interior doors. As allowed per 2022 California Building Code Section 11B-404.2.9, local authority may increase the allowable pressure for fire doors to achieve positive latching, but not to exceed 15-pounds.
      a. Exception: exterior doors' pressure-to-open may be increased to 8.5-pounds if: at a single location, and one of a bank of eight leafs or fraction of eight, and one leaf of this bank is fitted with a low- or high-energy operator.
   7. Separate adjusting valves for closing speed, latching speed and backcheck, fourth valve for delayed action where scheduled.
   8. Extra-duty arms (EDA) at exterior doors scheduled with parallel arm units.
   9. Exterior door closers: tested to 100 hours of ASTM B117 salt spray test, furnish data on request.
   10. Exterior doors: seasonal adjustments not required for temperatures from 120 degrees F to -30 degrees F, furnish checking fluid data on request.
   11. Non-flaming fluid, will not fuel door or floor covering fires.
   12. Pressure Relief Valves (PRV) not permitted.

2.6 OTHER HARDWARE

A. Automatic Flush Bolts: Low operating force design.
B. Overhead Stops: Non-plastic mechanisms and finished metal end caps. Field-changeable hold-open, friction and stop-only functions.
C. Kick Plates: Four beveled edges, .050 inches minimum thickness, height and width as scheduled. Sheet-metal screws of bronze or stainless steel to match other hardware.
D. Door Stops: Provide stops to protect walls, casework or other hardware.
   1. Unless otherwise noted in Hardware Sets, provide floor type with appropriate fasteners. Where floor type cannot be used, provide wall type. If neither can be used, provide overhead type.
   2. Locate overhead stops for maximum possible opening. Consult with Owner for furniture locations. Minimum: 90deg stop / 95deg deadstop. Note degree of opening in submittal.
E. Thresholds: As scheduled and per details. Comply with CBC 2022 11B-404.2.5. Substitute products: certify that the products equal or exceed specified material's thickness. Proposed substitutions: submit for approval.
   1. Saddle thresholds: 0.125 inches minimum thickness.
   2. Exteriors: Seal perimeter to exclude water and vermin. Use sealant complying with requirements in Division 7 "Thermal and Moisture Protection". Minimum 0.25 inch diameter fasteners and lead expansion shield anchors, or Red-Head #SFS-1420 (or approved equivalent) Flat Head Sleeve Anchors. National Guard Products' "COMBO" or Pemko Manufacturing's "FHSL".
   3. Fire-rated openings, 90-minutes or less duration: use thresholds to interrupt floor covering material under the door where that material has a critical radiant flux value less than 0.22

watts per square centimeter, per NFPA 253. Use threshold unit as scheduled. If none scheduled, include a 0.25in high 5in wide saddle in the bid, and request direction from Architect.

4. Fire-rated openings, 3-hour duration**:** Thresholds, where scheduled, to extend full jamb depth.
5. Acoustic openings**:** Set units in full bed of Division-7-compliant, leave no air space between threshold and substrate.
6. Plastic plugs with wood or sheet metal screws are not an acceptable substitute for specified fastening methods.
7. Fasteners**:** Generally, exposed screws to be Phillips or Robertson drive. Pinned TORX drive at high security areas. Flat head sleeve anchors (FHSL) may be slotted drive. Sheet metal and wood screws**:** full-thread. Sleeve nuts**:** full length to prevent door compression.

F. Through-bolts**:** Do not use. Coordinate with wood doors; ensure provision of proper blocking to support wood screws for mounting panic hardware and door closers. Coordinate with metal doors and frames; ensure provision of proper reinforcement to support machine screws for mounting panic hardware and door closers.
   1. Exception**:** surface-mounted overhead stops, holders, and friction stays.
G. Silencers**:** Interior hollow metal frames, 3 for single doors, 4 for pairs of doors. Leave no unfilled/uncovered pre-punched silencer holes. Intent**:** door bears against silencers, seals make minimal contact with minimal compression – only enough to effect a seal.
H. Key Control Software**:** Same manufacturer as key cylinders, supply to Owner.

2.7 FINISH:

A. As indicated on drawings, or Architect to select from manufacturer's standard finishes.

2.8 KEYING REQUIREMENTS

A. Key System**:** existing (Sargent, Corbin-Russwin, Medeco, etc) system. Initiate and conduct meeting(s) with Owner to determine system structure, furnish Owner's written approval of the system; do not order keys or cylinders without written confirmation of actual requirements from the Owner. Furnish temporary construction-keyed and permanent cylinders. Contractor to demonstrate to the Owner that temporary keys no longer operate the locking cylinders at the end of the project.

PART 3 - EXECUTION

3.1 ACCEPTABLE INSTALLERS:

A. Can read and understand manufacturers' templates, suppliers' hardware schedule and printed installation instructions. Can readily distinguish drywall screws from manufacturers' furnished fasteners. Available to meet with manufacturers' representatives and related trades to discuss installation of hardware.

3.2 PREPARATION

A. Ensure that walls and frames are square and plumb before hardware installation. Make corrections before commencing hardware installation. Installation denotes acceptance of wall/frame condition.
B. Locate hardware per SDI-100 and applicable building, fire, life-safety, accessibility, and security codes.
   1. Notify Architect of code conflicts before ordering material.
   2. Locate latching hardware between 34 inches to 44 inches above the finished floor, per California Building Code, Section 1008.1.9.2 and 11B-404.2.7.
   3. Locate panic hardware between 36 inches to 44 inches above the finished floor.

4. Where new hardware is to be installed near existing doors/hardware scheduled to remain, match locations of existing hardware.

C. Overhead stops**:** before installing, determine proposed locations of furniture items, fixtures, and other items to be protected by the overhead stop's action.

3.3 INSTALLATION

A. Install hardware per manufacturer’s instructions and recommendations. Do not install surface-mounted items until finishes have been completed on substrate. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate for proper installation and operation. Remove and reinstall or replace work deemed defective by Architect.
   1. Gaskets**:** install jamb-applied gaskets before closers, overhead stops, rim strikes, etc; fasten hardware over and through these seals. Install sweeps across bottoms of doors before astragals, cope sweeps around bottom pivots, trim astragals to tops of sweeps.
   2. When hardware is to be attached to existing metal surface and insufficient reinforcement exists, use RivNuts, NutSerts or similar anchoring device for screws.
   3. Use manufacturers' fasteners furnished with hardware items, or submit Request for Substitution with Architect.
   4. Replace fasteners damaged by power-driven tools.
B. Locate floor stops no more that 4 inches from walls and not within paths of travel. See paragraph 2.2 regarding hinge widths, door should be well clear of point of wall reveal. Point of door contact no closer to the hinge edge than half the door width. Where situation is questionable or difficult, contact Architect for direction.
C. Core concrete for exterior door stop anchors. Set anchors in approved non-shrink grout.
D. Locate overhead stops for minimum 90 degrees at rest and for maximum allowable degree of swing.
E. Drill pilot holes for fasteners in wood doors and/or frames.
F. Lubricate and adjust existing hardware scheduled to remain. Carefully remove and give to Owner items not scheduled for reuse.

3.4 ADJUSTING

A. Adjust and check for proper operation and function. Replace units, which cannot be adjusted to operate freely and smoothly.
   1. Hardware damaged by improper installation or adjustment methods**:** repair or replace to Owner’s satisfaction.
   2. Adjust doors to fully latch with no more than 1 pound of pressure.
      a. Door closer valves: turn valves clockwise until at bottom – do not force. Turn valves back out one and one-half turns and begin adjustment process from that point. Do not force valves beyond three full turns counterclockwise.
   3. Adjust delayed-action closers on fire-rated doors to fully close from fully-opened position in no more than 10 seconds.
   4. Adjust door closers per 1.9 this section.
B. Inspection of fire door assemblies and means-of-egress panic-hardware doors**:** Per 2022 NFPA-80 5.2.1: hire an independent third-party inspection service to prepare a report listing these doors, and include a statement that there are zero deficiencies with the fire-rated assemblies and the openings with panic hardware. Certification, Testing and Quality Control shall be in accordance with Division 01 45 23 Testing and Inspection services. All doors hardware and installation will be inspected by a third party selected by the architect/owner

   Div 01 45 23:
   1. Per 2022 NFPA-80 5.2.1: Use a third party inspector not associated with the construction, supply or installation of this project to develop a field survey of the doors and

hardware. Survey is to be done by a member certified as a FDAI (Fire Door Assembly Inspector), Certified AHC (Architectural Hardware Consultant) or a certified testing laboratory: UL or Intertek. Certified Inspectors may be found at DHI.org, Intertek, or CAFDI.org.

C. Fire-rated doors**:**
   1. Wood doors**:** adjust to 0.125 inches clearance at heads, jambs, and meeting stiles.
   2. Steel doors**:** adjust to 0.063 inches minimum to 0.188 inches maximum clearance at heads, jambs, and meeting stiles.
   3. Adjust wood and steel doors to 0.75 inches maximum clearance (undercut) above threshold or finish floor material under door.

D. Final inspection**:** Installer to provide letter to Owner that upon completion installer has visited the Project and has accomplished the following**:**
   1. Has re-adjusted hardware.
   2. Has evaluated maintenance procedures and recommend changes or additions, and instructed Owner's personnel.
   3. Has identified items that have deteriorated or failed.
   4. Has submitted written report identifying problems.

3.5 DEMONSTRATION

A. Demonstrate mechanical hardware and electrical, electronic and pneumatic hardware systems, including adjustment and maintenance procedures.

3.6 PROTECTION/CLEANING

A. Cover installed hardware, protect from paint, cleaning agents, weathering, carts/barrows, etc. Remove covering materials and clean hardware just prior to substantial completion.

B. Clean adjacent wall, frame and door surfaces soiled from installation / reinstallation process.

3.7 SCHEDULE OF FINISH HARDWARE

A. See door schedule in drawings for hardware set assignments.

B. Do not order material until submittal has been reviewed, stamped, and signed by Architect's door hardware consultant.

END OF SECTION

SECTION 088000
GLAZING

PART I – GENERAL

1.1 SUMMARY

A. Section includes:
   1. Glass products
   2. Tempered glass
   3. Glazing sealants
   4. Glazing tapes
   5. Miscellaneous glazing materials

B. Related Requirements:
   1. Section 084113: Aluminum Storefront

1.2 SYSTEM REQUIREMENTS

A. Design Requirements:
   1. Provide continuity of building enclosure to maintain continuous air and vapor barrier throughout glazed assembly from glass pane to heel bead to sealant.

B. Performance Requirements: Provide thickness of glass units to withstand wind loads.

C. Glazing Requirements:
   1. Comply with CPSC 16 CFR 1201 and ANSI Z97.1 for safety requirements of glazing materials.
   2. Glass thickness, where indicated, are minimum requirements and are to be confirmed by glass manufacturer.
   3. Provide glass of thickness and heat treatment (annealed, heat strengthened or fully tempered) as necessary to prevent temperature stress breakage.
   4. Use 2.5 safety factor of glass to statistical probability of failure (8 lites/ 1000).
   5. Obtain safety glazing products permanently marked with certification label of the Safety Glazing Certification Council or another classification agency acceptable to authorities having jurisdiction.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300:

B. Product Data: Manufacturer's product data for each type of glass and glazing material specified, including glazing accessories and glazing sealants.

C. Shop Drawings:
   1. Sections and details of glass and glazing materials installation at framing members including head, mullion, transoms, jambs, and sills.
   2. Stamp shop drawings with seal and signature of professional engineer responsible for design.

D. Samples: 12 inches x 12 inches in size illustrating color and pattern of glass.

E. Submit the following informational submittals:
   1. Test Reports:
      a. Glazing sealant indicating substrate adhesion.
      b. Glazing sealant compatibility.
      c. Glazing sealant manufacturer's recommendations.
   2. Certifications specified in Quality Assurance article.
   3. Qualification Data: Engineer's and installer's qualification data.

4. Manufacturer's instructions.

F. Closeout Submittals:
   1. Warranty: Submit specified warranty.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Glass of each type to be produced by same manufacturer.

B. Engineer Qualifications: Registered professional engineer licensed to practice structural engineering, with minimum of 5 years experience in design of glass and glazing.

C. Installer Qualifications: Acceptable to manufacturer with documented experience on at least 5 projects of similar nature in past 5 years.

D. Regulatory Requirements:
   1. Fabricate glass to comply with ASTM C1036, ASTM C1048, and ANSI Z97.1
   2. Perform work in accordance with GANA Glazing Manual for glazing installation methods.

E. Certifications:
   1. Manufacturer's letter certifying glass and glazing materials compatibility.
   2. Manufacturer's letter certifying that sealed insulating glass units meet or exceed specification.
   3. Engineering certifications.

1.5 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference at Project Site.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products in accordance with manufacturer's instructions.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Perform glazing when ambient temperature is above 40 degrees F.
   2. Perform glazing on dry surfaces only.

1.8 WARRANTY

1. Manufacturer's standard 5 year warranty on hermetically sealed insulating glass units.

PART 2 - PRODUCTS

2.1 GLASS MATERIALS

A. Clear Glass: Per Materials Finish List, or as Indicated on the Drawings.

B. Frosted Glass: Per Materials Finish List, or as Indicated on the Drawings.

C. Clear Tempered Glass: Same type as above except tempered, complying with ASTM C1048, Kind FT fully tempered.

1. Manufacturers:
    a. Technical Glass Products Inc. (TGP), Painesville Township, OH
    b. Guardian Glass, Auburn Hills, MI
    c. Vitro Architectural Glass
    d. Walker Glass Company, Ltd.

D. Safety Wired Glazing: Flat glass with embedded wire mesh.
1. Manufacturers:
    a. Techical Glass Products Inc.
    b. GGI
    c. Torstenson Glass Co (TGC)
2. Construction: clear, annealed glass, M2 Georgian (square) mesh, ASTM C1036

2.2 GLAZING MATERIALS

A. Setting Blocks.
1. Material: Performed neoprene, compatible with sealant.
2. Hardness: 80-90 Shore A durometer.
3. Size: 0.10 inch for each square foot of glazing, not less than 4 inch length by width of channel minus 1/16 inch by sufficient height to provided minimum edge clearance.
4. Location: Sill quarter points, centered minimum 4 inches from each edge.
5. Requirement: Resistant to sunlight, weathering oxidation and permanent deformation under load.

B. Spacer Shims:
1. Material: Performed neoprene, compatible with sealant.
2. Hardness: 50-60 Shore A durometer.
3. Size: Minimum 3 inch length by ½ height of glazing stop by thickness to suit application.

C. Edge Blocks:
1. Material: Preformed neoprene, compatible with sealant.
2. Hardness: 60-70 Shore A durometer.
3. Size: Minimum 4 inch length by width to support thickness of glass, allow nominal 1/8 inch clearance between edge of glass and edge bumper.
4. Location: Place in vertical channel.
5. Requirement: Resistant to sunlight, weathering, oxidation and permanent deformation under load.

D. Glazing Tapes:
1. Material: Preformed butyl or closed cell PVC foam with integral spacing device and containing paper release.
2. Hardness: 10-15 Shore A durometer.
3. Size: Continuous corner to corner.
4. Acceptable products:
    a. Pre-Shimmed 440 Tape, Tremco, Inc.
    b. Norseal V-980, Saint Gobain Performance Plastics

2.3 GLASS FABRICATION

A. Accurately size glass to fit openings allowing clearances following recommendations of “Glazing Manual” published by Glass Association of North America (GANA).

B. Cut glass clean and carefully. Nicks and damaged edges will not be accepted. Replace glass with damaged edges.

C. Heat Treatment::
   1. Ensure heat-strengthened and tempered glass is examined by glass manufacturer to detect ad discard lights with exceed GANA and industry standard tolerances for bow.
   2. Where strengthening process results in essentially parallel ripples or waves, maximum allowable deviation from flatness at any peak-to-valley is 0.003 inch.
   3. Where bow tolerance and wave tolerance differ, stricter requirement governs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with manufacturer’s procedures.

B. Verify that openings for glazings are correctly sized and within tolerances.

C. Verify that glazing channel surfaces or recesses are clear, free of burrs, obstructions, irregularities, and glass is free of edge damage or imperfections.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

3.3 INSTALLATION

A. Install glass units in accordance with manufacturer's instructions. Ensure weep and drainage holes are not blocked by sealants or setting blocks.

B. Preformed Glazing Gaskets (Dry Method):
   1. Cut gasket to proper length.
   2. Weld joints by butting gasket and sealing junctions with sealant.
   3. Place setting blocks at quarter points, with edge blocks no more than 6 inches from corner.
   4. Rest glass on setting blocks and push against stop with sufficient pressure to ensure full contact and adhesion to perimeter.
   5. Install removable stops, avoiding displacement of gasket and exert pressure for full continuous contact.

C. Interior Dry Method:
   1. Cut glazing tape to length and install against permanent stop, projecting 1/16 inch above sight line.

2. Place setting blocks at ¼ points with edge blocks no more than 6 inches from corners.
3. Rest glass on setting blocks and push against stop for full contact and adhesion at perimeter.
4. Place glazing tape on free perimeter of glass in same manner described above.
5. Install removable stop, avoid displacement of tape, exert pressure on tape for full continuous contact.
6. Knife trim excess or protruding tape.

D. Tempered Glass:
   1. Do not cut, seam, nip, or abrade tempered glass.
   2. Install in windows and sidelights where required by code.

3.4 CLEANING

A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.

B. Remove non-permanent labels immediately after glazing installation is complete.

C. Clean glass and adjacent surfaces after sealants are fully cured.

D. Clean glass on both exposed surfaces not more than 7 days prior to Date of Substantial Completion in accordance with glass manufacturer's written instructions.

3.5 PROTECTION

A. Protect finished Work.

B. After installation, mark glass pane with an “X” by using removable plastic tape or paste.

END OF SECTION

SECTION 092214
FURRING AND LATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal lath.
   2. Metal trim and accessories.

B. Related Sections:
   1. Section 061643 – Gypsum Sheathing: Substrate sheathing and Grade D paper bond breaker/
   2. Section 072700 – Air Barrier.
   3. Section 079200 – Joint Sealants
   4. Section 092400 - Portland Cement Plastering.

1.2 SUBMITTALS

A. General: Submit following items in accordance with Section 013300.

B. Product Data: Submit product data for each product.

C. Shop Drawings: Submit detailed shop drawings of unusual conditions in connection with furring and lathing work, including control and expansion joints, reveals, special hangers, special runners, deflection channels and details at light fixtures and other recessed items.
   1. Show sealant application to ensure watertight installation at metal trim joints.
   2. Show framing and supports to resist wind uplift at soffits.

D. Submit following Informational Submittals:
   1. Qualification Data: Applicator's qualification data.
   2. Manufacturer's instructions.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in metal furring and lathing work having minimum of 5 years successful documented experience with work comparable to that indicated and specified.

1.4 FIELD SAMPLES

A. General: Comply with provisions of Section 014500.

B. Provide furring and lathing systems in conjunction with field samples specified in following sections:
   1. Section 092400 - Portland Cement Plastering.

1.5 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119.
   1. Require attendance of furring and lathing installer and installers of related work, including sealants.
   2. Review installation procedures and coordination required with related work.

1.6 DELIVERY, STORAGE, AND HANDLING

A. General: Deliver, store, handle, and protect products in accordance with Section 016600.

B. Deliver to Project Site promptly without undue exposure to weather.

C. Deliver materials in manufacturer's unopened container or bundles, fully identified with name, brand, type and grade.

D. Store in dry ventilated space off the ground.

E. Protect materials from soiling, rusting and damage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Metal Trim:

1. Niles Building Products, Niles, OH.
2. Worthington Industries.
3. CEMCO
4. Clark Western
5. Dietrich

2.2 METAL LATH MATERIALS

A. General:
   1. Fabricate from cold-rolled steel, complying with ASTM C847, galvanized.
   2. Provide lath with “Grade D” asphalt saturated paper firmly attached to back for exterior applications on metal framing systems to act as bond breaker over weather/air barrier
B. Expanded Metal Lath: Flat for soffits; self-furring for walls; diamond mesh, 3.4 pounds per square yard.
   1. Acceptable: Structa Mega Lath or equal, self-furring welded wire lath.
C. Cornerite: Diamond mesh expanded metal lath, minimum 2.5 pounds per square yard, 6 inches wide, bent to form 3 inch wings.
D. Strip Mesh: Diamond mesh expanded metal lath, minimum 2.5 pounds per square yard, 4 inches wide.
E. Lath Attachment Devices: Tie wire or other metal supports, of type and size to suit application; to rigidly secure lathing materials in place.

2.3 METAL TRIM MATERIALS

A. General:
   1. Materials: Zinc alloy for exterior use.
   2. Shapes Used as Grounds: Sized and dimensioned to produce required plaster thickness.
   3. Flanges: Designed to permit complete embedment of accessory in plaster, alignment, and attachment to underlying surface.
B. Foundation Weep Screed: Fabricated from hot-dip galvanized steel sheet, ASTM A653/A653M, G60 zinc coating.
C. Cornerite: Fabricated from metal lath with ASTM A653/A653M, G60, hot-dip galvanized zinc coating.
D. External-Corner Reinforcement: Fabricated from metal lath with ASTM A653/A653M, G60 hot-dip galvanized zinc coating.
E. Cornerbeads: Fabricated from zinc.
   1. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
   2. Small nose cornerbead with perforated flanges; use on curved corners.
   3. Small nose cornerbead with expanded flanges reinforced by perforated stiffening rib; use on columns and for finishing masonry corners.
F. Casing Beads: Fabricated from zinc; square-edged style; with expanded flanges.
G. Control Joints: Fabricated from zinc; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
H. Two-Piece Expansion Joints: Fabricated from zinc; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4-to-5/8-inch wide; with perforated flanges.
I. Reveal Vent Screeds:
   1. Material and Finish: Clear anodized aluminum.
   2. Provide flanges for embedding into plaster system.
   3. Sizes as indicated on Drawings.
   4. Provide ventilating type for venting space above soffit.
   5. Manufacturers:

a. Conspec Systems, Inc./Cranford, Cranford, NJ.
b. Fry Reglet Corporation, Alhambra, CA.
c. Gordon, Inc., Shreveport, LA.
d. Pittcon Industries, Riverside, MD.

6. Provide protective coating on concealed surfaces to prevent adverse reaction to portland cement plaster.

2.4 ACCESSORIES

A. Flexible Flashing: Self-adhering rubberized asphalt tape.
1. Capable of being applied at temperature of 25 degrees F.
2. Thickness: 40 mils minimum.
3. Permeance: 0.1 perms.
4. Puncture Resistance: ASTM E514, 40 pounds-force, minimum.
5. Tensile Strength of Membrane: ASTM D412, 600 PSI, minimum.
6. Pliability: 180 degree bend over 1 inch at 25 degrees F.
7. Primer: Manufacturer's required surface primer.
8. Acceptable Products and Manufacturers:
a. FortiFlash 40, Fortifiber Building Systems.
b. V40, W.R. Grace Company.
c. Blueskin SA, Henry.
d. CCW 705 TWF, Carlisle Coatings and Waterproofing.
e. Rufco Shield 40, Raven Industries.
f. Or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work when substrate conditions are acceptable.

3.2 INSTALLATION

A. Install furring and lathing in accordance with applicable requirements of NAAMM Standard EMLA 920-09 and in accordance with ASTM C1063 for exterior work, except for more stringent requirements of manufacturer or these specifications.
B. Install members true to lines and levels and to maintain surface flatness with maximum variation of 1/8 inch in 10'-0" in any direction.
C. Isolate furring and lathing work from structural movement to prevent transfer of loading into work from building structure.
D. Control or Expansion Joints:
1. Do not continue lath and furring across control or expansion joints.
2. Provide where indicated and at supporting structure expansion or control joints and where panel sizes or dimensions change.
3. Space control joints for interior work maximum 18'-0" apart in either direction.
4. Control Joints for Exterior Work:
a. Install at 144 sq. ft. maximum with 18 feet longest length and no greater than 2-1/2 to 1 length to width ratio.
b. Walls: Apply sealant to each joint at ends and intersections in manner to allow expansion and contraction, but to exclude water infiltration.

c. Provide continuous 6 inch wide strip of flexible flashing under each reveal and control joint complying with Technical Services Information Bureau (www.tsib.org) Technical Bulletin No. 220.

3.3 METAL LATH

A. Apply lath in proper manner to form true surfaces, straight without sags or buckles.
B. Install with long dimension of lath at right angles to direction of supports.
C. Lap at sides not less than 1/2 inch and at ends not less than 1 inch.
D. Stagger end laps at adjoining sheets.
E. Secure to supports by wire ties or approved fasteners at intervals not exceeding 6 inches on centers.
F. Continuously reinforce internal corners with corner mesh, except where metal lath returns 3 inches from corner to form angle reinforcement; fasten at perimeter edges only.

3.4 METAL TRIM

A. Corner Beads:
   1. Provide at external corners and in single lengths where length of corner or jamb does not exceed standard stock lengths.
   2. Miter or cope at corners, and fasten securely with tie wire, hardened galvanized nails, staples or offset head or hooked lath nails.
   3. Space not more than 8 inches on centers staggered at outer edges.
B. Casing Beads:
   1. Provide where indicated and where plastering terminates and is not covered by other finish.
   2. Set beads level, plumb and true to line.
   3. Install in lengths as long as practicable and align joints with concealed splice or tie plates.
   4. Secure trims in such a manner as to hold them in place prior to and during the installation of plaster.
C. Control Joints:
   1. Install vertical joints where double stud backing occurs. Install accessory over substrate then install lath into the trim, securing the ends of the lath through the flanges of the accessory and into the double stud backing. Where no backing occurs, refer to NAAMM Standard EMLA 920-09 Architectural joint page 30.
   2. Space ties not more than 6 inches on centers.
   3. Walls: Apply sealant to each joint at ends and intersections in manner to allow expansion and contraction, but to exclude water infiltration.

END OF SECTION

SECTION 092400
PORTLAND CEMENT PLASTERING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Three coat portland cement plaster for application to metal lath over air and water barrier over solid sheathing.
   2. Factory-Prepared Acrylic Finish Coat per Drawings
   3. Finish Coat Textures: Names used to describe finish coat textures on Drawing or Specifications are based on catalog titled *Plaster Textures and Acrylic Finishes* published by the WWCCA / Technical Services Information Bureau. 1910 N. Lime Street, Orange, CA 92865. 714 221-5530 www.tsib.org.

B. Related Sections:
   1. Section 072700 – Air Barrier.
   2. Section 079200 - Joint Sealants
   3. Section 092214 – Furring and Lathing.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data:
   1. Submit product data for each product.
   2. Color Charts: Submit for Architect's verification of colors for finish coat having integral color.

C. Samples:
   1. Sample Panel: Submit sample panels of each finish not less than 2 foot square, on movable frames.

D. Submit following Informational Submittals:
   1. Certifications specified in Quality Assurance article.
   2. Qualification Data: Installer's qualification data.
   3. Manufacturer's instructions. Include applicable temperature ranges.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility:
   1. Except where specified otherwise, obtain plaster materials from a single manufacturer or from manufacturers recommended by prime manufacturer of portland cement plaster.

B. Installer Qualifications: Company specializing in portland cement plaster work having minimum of 5 years successful documented experience with work comparable to that indicated and specified.

1.4 FIELD SAMPLES AND MOCK-UPS

A. General: Comply with provisions of Section 014500.

B. Installation:
   1. For final review of each finish, construct sample panel of approximately 100 square feet as directed.
   2. Show transition to adjacent materials and construction techniques.

C. Record tools and techniques used in accepted sample for application of final work.

1.5 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119.

B. Require attendance of plaster installer and installers of related work. Review installation procedures and coordination required with related work.

1.6 DELIVER, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.
B. Deliver materials in manufacturer's unopened containers, fully identified with name, brand, type and grade.
C. Protect plaster materials from contamination and dampness until used. Store in dry, ventilated space, off ground.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after application of plaster.
B. Cold Weather Requirements:
   1. Do not use frozen materials in plaster mixes.
   2. Do not apply plaster to base which is wet, frozen or which contains frost.
   3. When ambient temperature is 40 degrees F and falling, heat materials and furnish heated enclosure for at least 24 hours after plastering in accordance with PCA recommendations.
C. Hot Weather Requirements:
   1. Comply with PCA recommendations.
   2. Protect plaster from uneven and excessive evaporation during hot, dry weather.

1.8 PROJECT CONDITIONS

A. Protect fixtures, frames, inserts and other contiguous work from rusting, soiling or clogging due to plastering.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Portland Cement:
   1. ASTM C150, Type I, II or III, or air-entrained equivalents as required.
   2. For finish coat, provide white or gray cement, or combination thereof as necessary to achieve selected color.
B. Hydrated Lime: ASTM C206, Type S.
C. Aggregates:
   1. ASTM C897.
   2. Gradation of base coats:

Cumulative Retained on **Standard Sieve**	Weight Percent **Minimum**	Retained **Maximum**
No. 4	-	0
No. 8	0	10
No. 16	10	40
No. 30	30	65
No. 50	70	90
No. 100	95	100
No. 200	97	100

D. Fiber Reinforcement: Alkaline-resistant (AR) glass or polypropylene fibers, 1/2 inch long, free of contaminates, manufactured for use in portland cement plaster scratch coat.

E. Crack isolation: Secondary fiberglass mesh reinforcement and base coat: As recommended by manufacturer to prevent likelihood of cracking.
F. Base Coat: Polymer modified base coat, applied over brown coat embedded with 4 oz/sq yd mesh to reduce cracking of the finish coat.
G. Primer: Manufacturer's proprietary primer for use over brown coat prior to application of acrylic based finish.
H. Finish Coat Bonder: Ethylene vinyl acetate emulsion which acts as a liquid bonding agent allowing adhesion of Portland cement materials to base coats or existing surfaces.
I. Factory-Prepared Acrylic Finish Coat:
    1. AkroFlex Smooth: 100% acrylic-based finish manufactured by Omega Products International, Inc. or equal.
    2. Color: Selected by Architect from Manufacturer's Standard Colors
J. Water: Suitable for domestic consumption, free of harmful soluble salts, acids, alkalis and other deleterious matter which would impair the work.

2.2 MIXES

A. Portland Cement Plaster: Mix and proportion cement plaster in accordance with ASTM C926
B. Finishes: Mixing and tinting instructions are contained in the appropriate manufacturer's product data sheets.
C. Basecoat: Mix with clean water to consistency of exterior Portland cement brown coat in accordance with manufacturer's instructions.
D. Finish Coat: Factory prepared mix requiring addition of water only in accordance with manufacturer's instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work in accordance with manufacturer's instructions.
B. Prior to the application of the portland cement plaster the plastering contractor shall ensure that:
    1. Surface and site conditions are ready to receive work.
    2. Grounds and Blocking: Verify that the items within the walls for other sections of work have been installed.
C. Substrates:
    1. Acceptable substrates must be securely fastened per applicable building code requirements.
    2. Acceptable substrates and adjacent materials must be dry, clean, and sound. Substrate surface must be flat, free of fins or planar irregularities greater than ¼-nch in 10-feet.
    3. Verify air barrier and penetration flashing has been installed.
D. Flashings: Install flashing and trims properly to insure moisture does not accumulate and can easily drain to the exterior. All openings shall be properly flashed and designed to allow water to escape to the outside of the wall. All penetrations shall be properly flashed and/or sealed using approved methods. Walls should be designed to prevent bulk water from getting behind the stucco or running down the face of the stucco. The bottom of the wall is required to have weep screed or another effective means to drain any water that may get behind the stucco.
E. Unsatisfactory conditions shall be reported to the general contractor and/or builder and/or architect and/or owner. Do not proceed until all unsatisfactory conditions have been corrected. Beginning of installation means acceptance of existing conditions.

F. Carefully examine lathing and accessories which are to receive plaster before plaster is applied. Do not apply plaster until unsatisfactory conditions are rectified and made suitable for application of plaster.
G. Carefully examine metal grounds such as corner beads, screeds and other accessories to see that they are straight, curved, plumb, level, square, or true to required angles before plaster is applied.
H. Substrate: Clean the substrate to which the plaster is to be applied, ensuring that there are no foreign materials present; including, but are not limited to, oil, dirt, dust form release agents, efflorescence, paint, wax, water repellants, moisture, frost, and or extended nails that may rupture the water-resistive barrier.
I. Surrounding Areas: Protect surfaces near the work of this section from damage, disfiguration, and overspray. Mask off all dissimilar materials.

3.2 INSTALLATION, GENERAL

A. Application Over Metal Lath: Apply per ASTM C926 and C1063. Apply portland cement plaster by hand-troweling or machine-spraying to a nominal thickness of 3/8-inch (9.5mm) scratch coat and to a nominal thickness of 3/8-inch (9.5 mm) brown coat
B. Do not exceed more than 1/8 inch in 10'-0" variation from true plumb or level plane in any exposed line of surface, as measured by 10'-0" straightedge placed on any location on surface.
C. Unless otherwise indicated, make interior angles square and external corners square.
D. Where casing beads do not occur at juncture of plaster and hollow metal frames, cut a groove in base coat and later in finish coat to minimize appearance of cracks at these joints.
E. To avoid abrupt changes in uniform appearance of succeeding coat, apply each plaster coat to an entire surface plane without interruption.
F. Joining of wet plaster to set plaster should be made at naturally occurring interruptions in plane of plaster, such as corners or openings in plaster work. Stoppage of plaster within a panel is not permitted.
G. In-plane tolerance for finish coat plaster shall be 1/4 inch in 10 feet maximum.
H. Moist Curing: Provide sufficient moisture by fog or moist curing to permit proper hydration of the cementitious materials. The length of time and most effective procedure for curing will depend on climatic and job conditions. Follow manufacturer’s instructions.

3.3 PLASTER APPLICATION ON LATH

A. Scratch Coat:
    1. Apply first coat with sufficient material and pressure to form full keys through, and to embed into, metal lath.
    2. Provide sufficient depth of material over metal lath to allow for scratching of surface.
    3. Bring surface to true even plane by rodding; fill surface defects and scratches.
    4. As soon as first coat has become firm, scratch entire surface in one direction only to provide mechanical bond with second coat.
    5. On vertical surfaces, scratch horizontally.
B. Brown Coat:
    1. Begin second coat application after 48 moist cure of scratch coat.
    2. Apply second coat with sufficient material and pressure to ensure tight contact with scratch coat.
    3. Bring surface to true even plane by rodding; fill surface defects and scratches.
    4. Pause and allow plaster to achieve proper moisture content so that necessary reconsolidation of plaster can be achieved. Determine correct time for floating by placing a finishing trowel against surface; trowel should not stick to unworked plaster.
    5. Float surface and leave uniformly rough to provide bond for finish coat.

6. Moist cure brown coat for 48 hours.
7. Allow scratch and brown coats to set for 7 to 10 days before application of basecoat, mesh, and finish coat.

C. Basecoat and Mesh: Apply 1 coat of basecoat and immediately embed 4-ounce mesh in the second coat of basecoat. Let dry 24 hours. Apply finish coat over base coat, prepared with manufacturer's recommended liquid bonding agent.

D. Finish Coat:
1. Provide tools and techniques as required to achieve specified finish.
2. Apply finish coat with sufficient pressure and material to ensure tight contact with, and complete coverage of, brown coat.
3. Bring to required plaster thickness; Finish coat not less than 1/16 inch
4. Finish surface to uniform semi-smooth finish to match accepted sample.

3.4 PATCHING

A. Work containing cracks, blisters, pits, checks, or discolorations will be rejected. Remove such work, and replace with new. Patching of defective work permitted only with approval of Architect.

B. Neatly perform cutting, patching, repairing and pointing-up operations. Repair cracks and indented surfaces by moistening plaster and filling with new material, troweled or tamped flush with adjoining surfaces.

C. Point-up and finish surfaces to match adjacent plaster.

D. Where new plaster adjoins plaster which has been installed more than 48 hours, cut existing plaster at an angle of approximately 45 degrees with surface before installing new plaster.

3.5 CLEANING

A. Remove plaster spillage promptly from adjoining work.

B. Remove protective coverings used to protect other work. Repair or replace surfaces which have been damaged by plastering work.

3.6 PROTECTION

A. Protect finished work from damage due to construction operations.

B. Protect plaster from weather, freezing, premature drying, marking, dirt, dust, marring or other damage throughout construction period so that it will be without any indication of damage at time of acceptance.

END OF SECTION

SECTION 092900
GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Gypsum board and partition framing systems.
   2. Gypsum board ceilings and suspension systems.
   3. Joint treatment (taping and bedding).
   4. Partition acoustical insulation, sealants, and acoustical accessories.
   5. Gypsum board metal trim and accessories.

1.2 DEFINITIONS

A. Wall: A vertical building element used to enclose or separate spaces. Walls include fixed partitions.

1.3 SYSTEM DESCRIPTION

A. Performance Requirements: Contractor responsible for selecting metal framing based on manufacturer span tables and deflection limits specified below to comply with performance requirements, including anchorage to structural system and necessary modifications to meet specified requirements and maintain visual design concepts.
   1. Interior Suspended Gypsum Board Ceilings, and Bulkheads: Design and install to provide deflection of not more than 1/360 of distance between supports.
   2. Interior Metal Stud/Gypsum Board Assemblies: Design and install to withstand lateral loading (air pressure) of 5 PSF with deflection limit not more than 1/240 of partition height.
   3. Elevator Shaftwall Enclosure: Design and install to withstand lateral loading (air pressure) of 10 PSF with deflection limit not more than 1/240 of partition height.
   4. Interior Metal Stud/Gypsum Board Assemblies at Atriums, Lobbies, Service Corridors, Exits, and Elevator Lobbies: Design and install to withstand lateral loading (air pressure) of 10 PSF with deflection limit not more than L/360 of partition height.
   5. Interior Metal Stud/Gypsum Board Assemblies at Locations with Ceramic Tile or Other Hard Surface Finishes: Design and install to withstand lateral loading (air pressure) with deflection limit not more than L/360 of partition height.
   6. Where documents indicate a stud size, size shall be considered minimum. Increase metal thickness to meet minimum performance requirements.
   7. Accommodate building structure deflections in connections to structure.

1.4 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data:
   1. Submit product data for:
   2. Framing members selected based on span, deflection limits, and acoustical requirements for this Project; provide chart based on partition schedule and performance requirements showing framing member selections based on manufacturer’s published criteria.
   3. Control joints and locations.
   4. Include data to indicate framing member materials, product criteria, section properties, load charts, and limitations.
   5. Include information for factory finishes,.
C. Submit following Informational Submittals:
   1. Certifications specified in Quality Assurance article.
   2. Manufacturer's instructions. Include applicable temperature and humidity ranges, special procedures, and perimeter conditions requiring special attention.

1.5 QUALITY ASSURANCE

A. Source Responsibility: Except where specified otherwise, obtain gypsum board products, trim, joint treatment, and accessories from manufacturers recommended by prime manufacturer of gypsum board products.

B. Certifications:

1. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified in accordance with the product-certification program of the Steel Framing Industry Association (SFIA) or a similar organization that provides a verifiable code compliance program.
2. Submit manufacturer's certification that products furnished for Project meet or exceed specified requirements, including span ratings meeting deflection limits.
3. Submit certification for each proposed sound rated assembly attesting compliance with indicated requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

B. Storage and Protection:

1. Store in dry ventilated space off ground.
2. Protect materials from surface contamination, soiling, corrosion, construction traffic, and damage.
3. Support on level platform and fully protect from weather and direct sunlight exposure.
4. Store and support gypsum board in flat stacks to prevent sagging.
5. Protect materials to keep them dry. Remove wet gypsum board from Project site.
6. Protect gypsum board panels to prevent damage to edges, ends, and surfaces.
7. Do not bend or damage metal trim.
8. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202 "Code of Standard Practice."

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Comply with more restrictive of ASTM C840, or manufacturer's written requirements under which products can be installed.

1. Maintain minimum uniform 50 degrees F temperature in building for 48 hours before and continuously until applied joint treatment and bonding adhesives are thoroughly dry.
2. Do not allow ambient temperature to exceed 95 degrees F.
3. Provide ventilation to remove moisture in excess of that required for drying of joint treatment materials after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

PART 2 - PRODUCTS

2.1 FRAMING MATERIALS

A. General:

1. Studs, runners, and furring channels complying with AISI S220 and ASTM C645 for Project conditions.

Protective Coating: Comply with AISI S220; ASTM A653, G40; or coating with equivalent corrosion resistance of ASTM A653, G40. Galvannealed products are unacceptable

B. Steel Stud Framing Systems:

1. Non-load-bearing standard cold roll formed galvanized steel.

2. Wall studs: Channel-shaped design with punched web, manufacturer's standard return flange lip.
3. Proprietary stud designs using high strength embossed steel acceptable if performance deflection and loading requirements are met based on limiting span rating tested by manufacturer.
4. Track: Channel type members, with 1-1/4 inch flanges, and same sheet steel thickness as wall studs.
5. Deep Leg Track: Channel type members, with 2 inch flanges, and same sheet metal thickness as wall studs.
6. Bracing Members: Same size as studs.
7. Wall Studs:

Depth: Refer to Partition types.
Flange Size: 1-1/4 inch.
Base steel thickness: Based on manufacturer's certified third party tested assemblies for stud depth, span, loading, steel strength, and partition type.

C. Furring Channels: Hat-shape, 7/8 inch high, 0.022 inch base steel thickness.
D. Ceiling Framing - Channel and Cross Furring System:
   1. Comply with ASTM C754.
   2. Main Runner Channels:

Cold-rolled steel.
Size: 1-1/2 inch minimum.

   3. Furring Anchorages: 16 gage thick galvanized wire ties, or wire-type clips.

E. Ceiling Framing - Proprietary Direct Hung Suspension System:
   1. At Contractor's option, provide factory fabricated, proprietary system in lieu of channel and cross furring framing system.
   2. Provide interlocking cold-rolled sheet steel grid complying with ASTM C635, "Heavy Duty" structural classification.
   3. Acceptable Products and Manufacturers:

640 Drywall Furring System, Chicago Metallic, Chicago, IL.
DFR-Series, Worthington Steel, Malvern, PA.
Rigid X, USG Interiors, Inc., Chicago, IL.

F. Ceiling Attachment Devices:
   1. General:

Size devices for 5 times load imposed by completed system as determined in accordance with ASTM E488.
Powder-actuated fasteners in concrete: Size devices for 10 times load imposed by completed system as determined in accordance with ASTM E1190.

   2. Hanger Anchorage Devices: Screws, clips, bolts, inserts or other devices applicable to indicated method of structural anchorage for ceiling hangers and whose suitability for use intended has been proven by certified test data.
   3. Hangers: Comply with requirements of ASTM C754 for maximum ceiling area and loads to be supported.

2.2 GYPSUM BOARD PRODUCTS

A. Acceptable Manufacturers:
   1. Certainteed
   2. G-P Gypsum Corporation
   3. National Gypsum Company.

4. United States Gypsum Company.

B. Gypsum Board:
   1. Maximize use of recycled or synthetic gypsum with minimum of 5 percent.
   2. Use recycled newsprint including post-consumer waste for facing paper.
   3. Comply with ASTM C1396.
   4. Type X or manufacturer's proprietary fire rated core for fire rated and shaftwall assemblies and locations where indicated; regular type at other assemblies.
   5. Maximum available lengths to minimize end-to-end butt joints, square cut ends, tapered edge.
   6. Thickness: Refer to Drawings.

C. Impact Resistant Gypsum Board:
   1. Comply with ASTM C1396.
   2. Provide laminate clad backing if necessary to increase impact resistance to 260 ft-lbs. minimum.
   3. Thickness: 5/8 inch, except where indicated otherwise.
   4. Acceptable Manufacturers:

   Hi-Impact XP Gypsum Board, National Gypsum Company.
   Mold-Tough VHI Gypsum Board, United States Gypsum Company.
   DensArmor Plus Impact Resistant Interior Panel, G-P Gypsum Corporation.

D. Moisture- and Mold-Resistant Type: With moisture- and mold-resistant core and surfaces.
   1. Comply with ASTM C1396.
   2. Core: Mold and moisture resistant gypsum core, 5/8 [1/2] inch, Type X.
   3. Surface paper: 100% recycled content moisture/mold/mildew resistant paper on front, back, and long edges.
   4. Maximum available lengths to minimize end-to-end butt joints, square cut ends, tapered edge.
   5. Locations: Toilet Rooms; do not use on ceilings.
   6. Mold/Mildew Resistance: 10 when tested in accordance with ASTM D3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
   7. Product and Manufacturer:

   XP Wallboard, National Gypsum Company.
   Proroc® Moisture And Mold Resistant With M2tech, Certainteed
   Sheetrock Brand Mold Tough, USG.

E. Glass Fiber Faced Gypsum Sheathing: Refer to Section 061643.

2.3 METAL TRIM

A. General:
   1. Comply with ASTM C1047.
   2. Material: Zinc alloy or galvanized steel.
   3. Base sheet steel thickness: 0.0179 inch minimum.
   4. Flanges designed for concealment in joint compound, flange width to suit installation requirements.

B. Corner Beads at Straight Surfaces:
   1. 103 Deluxe or Quicksilver Corner Bead, ClarkDietrich. West Chester, OH.
   2. Cornerbead, Clinch-On Products, Mounds View, MN.
   3. Beadex B1XW Paper Faced Metal Outside Corner, United States Gypsum Company, Chicago, IL.

C. Edge Trim Beads:
   1. J-Trim, U-Trim, L-Trim, ClarkDietrich. West Chester, OH.
   2. L-Bead and U-Bead, Clinch-On Products, Mounds View, MN.
   3. B4 (L) and B9 (J) Paper Faced Metal Trim, United States Gypsum Company, Chicago, IL.

D. Control Joints:
   1. V-Shaped slot.
   2. Acceptable Products and Manufacturers:

E-Z Strip Expansion Joint, National Gypsum Company, Charlotte, NC.
093, Cemco.
#093 Zinc Control Joint by ClarkDietrich

2.4 JOINT TREATMENT AND ADHESIVES MATERIALS

A. Joint Compound:
   1. Comply with ASTM C475.
   2. Board manufacturer's standard ready-mixed joint compounds low-VOC joint compounds with no detectable amounts of crystalline silica.
   3. Compounds specifically manufactured for topping coats are not permitted for first coat on metal trim and taping.
   4. Use board manufacturer's joint compound unaffected by humidity at moisture-resistant gypsum board.
   5. Mixing:
      a. Mix compounds in strict accordance with manufacturer's directions.
      b. Mix only enough at one time to be used during recommended pot life of compound.
   6. Use manufacturer’s recommended compound for impact resistant gypsum board.

B. Joint Reinforcement Tape for Gypsum Board: Paper reinforcing tape complying with ASTM C475.

C. Adhesives and sealants shall meet or exceed the VOC and chemical component limits of SCAQMD Rule 1168, Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit, and Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

2.5 SURFACING MATERIAL

A. Primer/Surfacer:
   1. Flat latex basecoat for use on surfaces located in areas of intense lighting and indicated to receive a Level 4 finish. Basecoat is in addition to primer and finish coating specified in Section 099000.
   2. Products: Subject to compliance with requirements, provide one of the following products:
      a. “Builders Solution System Interior Latex Primer/Surfacer”, A63W100; Sherwin Williams.
      b. “SHEETROCK Primer-Surfaces “Tuff-Hide; USG Corporation.

2.6 ACCESSORIES

A. General: Provide auxiliary materials for gypsum board construction that comply with referenced standards and recommendations of gypsum board manufacturer.

B. Backer Plates:
   1. Type: 16 gage or 0.053 inch base steel thickness steel sheet, galvanized in accordance with ASTM A653, G60.
   2. Length: Sufficient to extend to nearest studs beyond maximum dimension of attached item and engage fasteners from attached item; span minimum 3 studs.
   3. Height: 6 inch minimum or higher where required to accommodate item being fastened.
   4. When manufacturer of attached item has more rigorous mounting plate requirements, comply with manufacturer's requirements.

C. Fasteners:
   1. Fasteners for Metal Framing:
      a. Provide fasteners of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel framing and furring members securely to substrates involved.
      b. Comply with the gypsum board manufacturer requirements for indicated applications.
   2. Gypsum Board Fasteners:
      a. Self-drilling, self-tapping, bugle head screws conforming to ASTM C1002, length to suit application.
      b. Type S screws for 0.0329 to 0.0179 inches; 20 to 26 gage thick metal framing and furring.
      c. Type S-12 screws for 0.0966 to 0.0329 inches; 12 to 20 gage thick metal framing and furring.
      d. Type G screws for gypsum board to gypsum board.

D. Acoustical Sound Batt Insulation:
   1. Maximize use of recycled material with minimum of 20 percent recycled glass cullet.
   2. Use formaldehyde free materials where available.
   3. Comply with ASTM C665, Type I.
   4. Mineral or glass fiber, friction fit, without integral vapor barrier membrane.
   5. Flame spread 25 or less when tested in accordance with ASTM E84.
   6. Thickness: 3-1/2” unless noted otherwise.
   7. Non-fire-rated assemblies: Use glass or mineral fiber products.
   8. Acceptable Glass Fiber Products:
      a. Sound Attenuation Batts, Owens Corning, Toledo, OH.
      b. Sound Control Batts, CertainTeed Corporation, Valley Forge, PA.
      c. Sound Control Batts, Johns Manville, Denver, CO.

E. Acoustical Sealant - Concealed Locations:
   1. Description:
      a. Non-hardening, non-drying, non-skinning, non-staining, non-bleeding, non-sag synthetic rubber.
      b. Capable of maintaining air-tight seal.
      c. For use in concealed locations not exposed to view.
      d. Specifically manufactured as acoustical sealant.
      e. Confirm acceptability where sound rated walls intersect with fire rated walls.
   2. Acceptable Products:
      a. Acoustical Sealant; Tremco, Inc., Beachwood, OH.
      b. BA-98 Acoustical Sealant; Pecora Corporation, Harleysville, PA.
      c. USG Firecode Sound - Smoke Sealant, United States Gypsum Company, Chicago, IL

F. Acoustical Sealant - Exposed Locations:
   1. Description:
      a. ASTM C834.
      b. Non-sag, non-staining, non-bleeding, and paintable.
      c. Joint movement range without cohesive/adhesive failure: Plus 7.5 percent to minus 7.5 percent of joint width.
      d. Confirm acceptability where sound rated walls intersect with fire rated walls.
      e. Color: As selected by Architect from manufacturer's standard colors.
   2. Acceptable Products:
      a. AC-20, Pecora Corporation, Harleysville, PA.
      b. Sonolac, Sonneborn Division of BASF, Shakopee, MN.
      c. Acrylic Latex, Tremco, Inc., Beachwood, OH.

d. USG Acoustical Sealant, United States Gypsum Company, Chicago, IL.

G. Adhesives and sealants shall comply with VOC and chemical component limits of SCAQMD Rule 1168, Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit, and Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

H. Touch-Up Primer for Galvanized Surfaces: SSPC Paint 20.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work when substrate surfaces are ready to accept work of this Section.

B. Verify rough-in utilities and blocking are in proper position.

3.2 PREPARATION

A. Items Which Require Backer Plates or Blocking:
   1. Coordinate sizes and locations.
   2. Install additional studs for attachment of backer plates and blocking in required locations to receive surface mounted accessories as indicated or as required by accessory manufacturer.
   3. Elimination of backer plates and blocking is not permitted.
   4. Direct attachment of items to studs is not permitted.

3.3 FRAMING INSTALLATION

A. General:
   1. Install in accordance with manufacturer's printed instructions and building code requirements, except for more stringent requirements of these specifications.
   2. Install units plumb, level, square, and free from warp and twist while maintaining dimensional tolerances and alignment with surrounding construction.
   3. Installation Tolerances:
      a. Ceilings: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.
      b. Partitions:
         1) Maximum variation from true position: 1/8 inch.
         2) Maximum variation of any member from plane: 1/8 inch in 10-0" non-cumulative.
   4. Control and Expansion Joints:
      a. Do not bridge building control and expansion joints with metal framing systems.
      b. Install independent framing on each side of joints.

B. Framing:
   1. Install in accordance with ASTM C754 and with requirements of ASTM C840 that apply to framing installation, except for more stringent requirements of manufacturer or these Specifications.
   2. Suspended Ceilings:
      a. Install channel and cross-furring in accordance with ASTM C754.
      b. Install proprietary drywall suspension systems in accordance with ASTM C636.
      c. Coordinate location of hangers and framing with other construction above ceiling line.
      d. Install ceiling framing independent of walls, columns, and above ceiling non-structural construction.

e. Install free from contact with insulation and other objects within ceiling plenum that are not part of supporting structural or ceiling suspension system.
f. Offset hangers only where required to miss obstructions; resist resulting horizontal forces by bracing, or other means.
g. Where width of ducts and other construction within ceiling plenum produces interference with location of hangers required to support standard suspension system members:
    1) Install supplemental suspension members and hangers in form of trapezes or equivalent devices.
    2) Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
h. Do not connect or suspend steel framing from pipes, ducts, and conduit.
i. For proprietary grids, provide attachments and hangers from structural support above, spaced on a grid of 24 by 48 inches.
j. Do not attach hangers to steel deck tabs [or directly to metal roof deck]. Provide supplementary framing to span between structural framing members when structural framing members are spaced more than 48 inches apart.
k. Reinforce openings in framing which interrupt main runners, furring channels, and bracing. Extend reinforcing minimum of 24 inches past each end of each opening.
l. Proprietary direct hung framing: Tie direct to suspension; interconnect components in accordance with framing system manufacturer's instructions.
m. Space main runners at maximum 48 inches on center, unless otherwise indicated.
n. Space furring channels at maximum 16 inches on center, unless otherwise indicated.
o. Provide additional framing to fulfill structural requirements and for support at recessed fixtures and similar items.
p. Laterally brace entire suspension system.

3. Studs and Runners:
a. Stud Spacing: Provide as indicated.
b. Stud Spacing at Walls Scheduled or Indicated to Receive Ceramic Tile: Provide studs spaced at 16 inches on center.
c. Runner Tracks: Provide continuous tracks sized to match studs.
d. Where walls are indicated to extend to overhead surfaces (ceilings, deck construction, and structural elements), to prevent deflection transfer of structural loads or movements to walls provide either:
    1) Insert studs into runner tracks with minimum 1/2 inch gap between end of stud and inside surface of top and bottom runner. Maintain minimum of 1/2 inch engagement between end of stud and end of legs of top and bottom runners.
    2) Slip joint between walls and structure using top runner nested within 3 inch long segment of extended leg ceiling runner positioned at stud spacing and fastened to overhead surface. Do not fasten top runner to extended leg ceiling runner.
e. Where walls are indicated to have framing extend only to ceiling attach ceiling runner securely to acoustical ceiling grid.
f. Brace stud framing rigid which is not clad on both sides with gypsum board. Fasten horizontal stud or 1-1/2 inch wide 0.0359 inch galvanized steel straps vertically spaced no more than 36 inches apart with top strap no more than 6 inches from top of wall.
g. Horizontally align openings in stud webs.
h. Use full length studs vertically positioned between runner tracks.

i. Minimum Jamb Stud Framing at Door Openings: Provide double studs at door and sidelite openings.
   1) At welded frames with fixed anchor clips, secure studs to jamb anchors clips with not less than two self tapping screws per clip.
   2) Provide wall framing above door openings to match wall framing adjoining the opening.
   3) Provide one additional stud not more than 6 inches from jamb studs.

j. Fabricate corners with a minimum of three studs.

k. Provide additional studs and framing to support wall intersections, termination of walls, at openings and cut-outs and to support built-in anchorage and attachment devices for other work.

l. Locate studs no more than 2 inches from abutting walls, wall corners and other construction. Start typical wall studs 6 inches either side of stud reinforcing or frames.

m. Install electrical outlets and similar junction boxes at indicated locations. Provide additional blocking and straps for proper locations; do not mount on "nearest" stud.

n. Install steel studs so that flanges point in the same direction and so that leading edges or ends of each gypsum board can be attached to open (unsupported) edges of stud flanges first.

4. Shaftwalls:
   a. Position top and bottom "J" runners with short leg toward the finish side of the wall and securely fasten to the construction at both ends and at intermediate points, maximum 24 inches apart.
   b. Isolate shaftwall framing from transfer of structural loading to system, both horizontally and vertically. Provide slip or perimeter movement relief type joints in accordance with manufacturer's instructions to attain lateral support and avoid axial loading.
   c. Support elevator hoistway door operating equipment independently of shaftwall framing system.
   d. Frame opening for elevator hoistway door frame in accordance with requirements of elevator and shaftwall manufacturers.
   e. Install supplementary framing, and bracing to support fixtures, equipment, services, heavy trim, furnishing and similar work which cannot be adequately supported directly on shaftwall framing.
5. Backer Plates:
   a. Provide backer plate for securing surface mounted fittings, fixtures, accessories, and furnishings, including, but not limited to handrails, grab bars, toilet walls, towel bars, wall mounted door stops, and similar screw- and bolt-fastened items.
   b. Secure with sufficient quantity of self-tapping sheet metal screws to sustain loads imposed by items attached to backer plates.
6. Blocking: Coordinate with Section 061053 for installation of concealed wood blocking and furring required for securing wood trim, carpentry, woodwork, cabinets, millwork, casework, surface mounted equipment, and similar nail-fastened items.

3.4 GYPSUM BOARD INSTALLATION

A. General:
   1. Comply with more stringent requirements of GA 216, ASTM C840, manufacturer, and these Specifications.
   2. Install impact resistant gypsum board where indicated on Drawings.
   3. Install gypsum board panels with face side out.
   4. Use boards of maximum length to minimize end joints.

5. Abut boards without forcing; neatly fit ends and edges of board and do not place butt ends against tapered edges with gap between adjacent panels no greater than 1/16 inch. Hold bottom of board 1/4 inch above floor.
6. Support ends or edges of board directly on framing or furring members.
7. Joint Staggering:

Ceilings: Stagger end joints not less than one framing member.

Walls: Stagger vertical joints on opposite side of walls to occur on alternate framing members.

8. Do not locate gypsum board joints within 12 inches of external corners of windows, doors, or other such openings, except when control joints are installed at corners.
9. Cut openings in board with no greater than 1/4 inch gap around electrical outlets, plumbing, light fixtures, piping and other similar penetration items and small enough to be covered by plates and escutcheons.
10. Do not install imperfect, damp and damaged boards.
11. In concealed spaces above ceilings where designated walls extend full height to structure above, install boards in full coverage on both faces of framing system for fire, sound, air, and smoke-rated walls.
12. Fit gypsum panels around ducts, pipes, and conduits.
13. Where walls intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4 to 1/2-inch wide joints to install sealant.
14. In concealed spaces above ceiling where designated chase walls extend full height to structure above, install boards in full coverage on one face of framing system. Fasten horizontal stud or 1-1/2 inch wide 0.0359 inch galvanized steel straps vertically spaced no more than 36 inches apart with top strap no more than 6 inches from top of wall.
15. Attach gypsum panels to steel studs so that leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
16. Attach gypsum panels to framing provided at openings and cutouts.
    a. Isolate perimeter of non-load-bearing gypsum board walls at structural abutments, except floors, as detailed. Provide 1/4 to 1/2-inch wide spaces and trim edges with LC-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant for exposed locations.
17. Control and Expansion Joints: Gypsum Association Publication GA 234.
    a. Spacing: In accordance with GA 234.
    b. Do not bridge building control and expansion joints with gypsum board. Utilize details shown in referenced standard.
    c. Terminate gypsum board on each side of joints.

B. Fasteners:
1. Attachment Methods:
    a. Attach board to framing and furring with screws.
    b. Attach board to board with screws.
2. Except where indicated otherwise, space fasteners in compliance with more restrictive requirements of referenced installation standards or manufacturer's requirements.
3. Attach board to supplementary framing and blocking which provide additional support at openings and cutouts.

C. Ceilings:
1. Place with long edge perpendicular to orientation of furring or framing members.

D. Single Layer Wall Installation: Install vertically in manner which will minimize end-butt joints, unless specific orientation is required by fire-rating design.
E. Double Layer Wall Installation:
   1. Install gypsum board for base layer, place long edge parallel to framing or furring members.
   2. Install gypsum board for face layer, place parallel to base layer with offset joints.
   3. Secure base layer with fasteners.
   4. Secure face layer with fasteners or adhesive supplemented with fasteners.

3.5 SOUND ASSEMBLIES

A. Acoustical Insulation:
   1. Install acoustical insulation in walls where indicated.
   2. Place insulation for full distance of space between studs for full coverage of sound-rated assembly.
   3. Fit insulation tight within spaces, around cut openings, behind and around electrical and mechanical items within or behind walls and tight to items passing through walls.

3.6 TRIM INSTALLATION

A. Install trim flush using longest practical length; miter corners and intersections.
B. Secure flanges by taping compound, screws, stapling, or clinching in accordance with manufacturer's instructions.
C. Install corner beads at visually-exposed external corners, unless otherwise indicated.
D. Install edge trim where edge of board would be exposed or semi-exposed and where board abuts dissimilar materials.
E. Control Joints: Coordinate placement and locations with Architect prior to commencement of work. Install control joints where indicated on Drawings and additionally in accordance with following:

3.5 LOCATE AT JOINTS OF MAXIMUM STRESS, AT POINTS OF NATURAL WEAK PLANES, SUCH AS AT OPENINGS AND AT CORNERS OF OFFSETS IN WALLS EXCEEDING 30'-0" IN LENGTH.
   1. Extend control joints from both corners of door frames to top of wall where doors occur in long runs of wall.
   2. Where gypsum board is vertically continuous, as at stairwells and other long vertical wall areas, provide horizontal control joints at each floor level at top runner of shaftwall, at slip joints in shaftwall framing, and breaks in shaftwall framing.
   3. Locate in ceilings with area exceeding 900 square feet, where framing or furring changes direction, and spaced apart not more than 30'-0".
   4. Locate in ceilings where wings of "L", "U", and "T" shaped areas are joined.

3.6 GYPSUM BOARD TREATMENTS

A. General:
   1. Apply joint treatment to gypsum board joints (both directions); flanges of corner beads, edge trim, and control joints; penetrations; fasteners; surface defects; and elsewhere to prepare surfaces for decoration and specified levels of gypsum board finish.
   2. Comply with manufacturer requirements for hardening and drying of joint treatment prior to application of succeeding coats.
B. Prefill: Fill open joints, rounded and beveled edges, and damaged areas, flush with adjoining surfaces using prefill compound.
C. Apply joint tape over gypsum board joints [and to architectural metal trim with concealed face flanges as required by architectural metal trim manufacturer and as required to prevent cracks from developing in joint compound at flange edges].
D. Levels of Finish:

1. Comply with GA-214; italicized commentary is excluded; replace words "may" and "should" with "shall."
2. Locations to Receive Level 5 Finish: Critical Lighting of surfaces such as walls and ceilings adjacent to window mullions, long hallways, and areas specifically identified on Drawings. Confirm locations with Architect.
3. Locations to Receive Level 4 Finish: Areas to be painted.

3.7 ADJUSTING

A. Adjust and align metal framing to properly receive final finishes in accordance with required tolerances.
B. Correct damages, defects, and leave work ready for decoration. Clean compounds from trim. Visible cracks, nail heads, tool marks, waves, distortions, or other similar defects shall not appear in finished work.

3.8 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods which may damage finish or surrounding construction.
B. Promptly remove joint compound from surfaces not intended to receive compound.

3.9 PROTECTION

A. Protect finished work from damage due to construction operations.
B. Protect metal framing from damage detrimental to finished work.

END OF SECTION

SECTION 093000
TILING

PART 1 - GENERAL

1.4 SUMMARY

A. Section Includes:
   1. Interior tiling.
   2. Setting materials.
   3. Grouts.

B. Related Sections:
   1. Section 079200 - Joint Sealants.
   2. Section 123663 – Solid Surface Fabrications: Quartz thresholds.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 013300.

B. Product Data: Submit product data for each product.

C. Shop Drawings:
   1. Show perimeter conditions and junctions with dissimilar materials.
   2. Indicate and detail expansion and control joints.

D. Samples:
   1. Tile: Submit tile samples for each type, color and size.
   2. Grout: Submit samples mounted in 6 inch long metal channels for each type and color selected.

E. Submit following Informational Submittals:
   1. Certifications specified in Quality Assurance article.
   2. Qualification Data: Manufacturer's and installer's qualification data.
   3. Manufacturer's instructions.
   4. Maintenance instructions.

F. Closeout Submittals:
   1. Submit under provisions of Section 017700.
   2. Maintenance data. Include stain removal methods.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility:
   1. Obtain each type and color tile material required from single source.
   2. Obtain setting and grouting materials from one manufacturer to ensure compatibility.

B. Manufacturer Qualifications:
   1. Tile: Minimum 5 years experience in manufacture of tile products.
   2. Setting materials: Minimum 10 years experience in manufacture of setting and grout materials specified.

3. [Waterproofing membrane: Minimum 5 years experience in manufacture of membrane materials specified.]

C. Installer Qualifications: Specializing in tile work having minimum of 5 years successful documented experience with work comparable to that required for this Project.

D. Accessibility Guidelines: Tile flooring shall be stable, firm, and slip resistant per CBC Section 11B-302.1

E. Floor Tile Slip Resistance: Comply with ANSI A326.3, 2017 edition Dynamic Coefficient of Friction AcuTest of 0.42 wet as tested with BOT-3000 Universal Walkway Tester.

F. Certifications:
1. Submit "Master Grade Certificate" for each type of ceramic and quarry tile in accordance with requirements of ANSI A137.1.
2. Submit manufacturer's certifications that mortars, adhesives and grouts are suitable for intended use.
3. Submit certification or independent testing, showing floor tile products meet industry standard as slip resistant.

1.4 FIELD SAMPLES

A. General: Comply with provisions of Section 014500.

B. Sample Installation:
1. For final review of each type tile, construct sample panel of approximately 100 square feet.
2. Install in location as directed by Architect.
3. Show workmanship of finished work and construction techniques.

1.5 PRE-INSTALLATION CONFERENCE

A. Conduct pre-installation conference in accordance with Section 013119.

B. Require attendance of installation material manufacturer, tile supplier, tile installer and installers of related work. Review installation procedures and coordination required with related work.

C. Meeting Agenda includes but is not Limited to:
1. Surface preparation.
2. Tile and installation material compatibility.

1.6 DELIVER, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

B. Labeling: Comply with ANSI A137.1

C. Deliver materials in manufacturer's unopened containers, fully identified with name, brand, type and grade.

D. Protect materials from contamination, dampness, freezing, or overheating in accordance with manufacturer's instructions.

E. Broken, cracked, chipped, stained, or damaged tile will be rejected, whether built-in or not.

F. Protect mortar and grout materials against moisture, soiling, or staining.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Comply with requirements of referenced standards and recommendations of material manufacturers for environmental conditions before, during, and after installation.

B. Maintain continuous and uniform building temperatures of not less than 50 degrees F during installation.

C. Ventilate spaces receiving tile in accordance with material manufacturers' instructions.

1.8 EXTRA STOCK AND MATERIALS

A. Deliver 1 percent of installed tile for each type, size, and color.

B. Store at Project site where directed. Ensure materials are boxed and identified by manufacturer, type and color.

PART 2 - PRODUCTS

2.1 TILE

A. Refer to Materials Finish List and as Indicated on Drawings.

2.2 SETTING BED MATERIALS

A. Polymer Modified Thinset Dryset Mortar:
   1. Description: One or two component system; factory prepared second generation high bond strength dryset mortar and polymer additive; complying with ANSI A118.15.
   2. For use at interior and exterior conditions, thermal and shock proof.
   3. Acceptable Products:
      a. Laticrete 254 Platinum, Laticrete International.
      b. UltraFlex 3, Mapei Corporation, Garland, TX.
      c. MegaLite Crack Prevention Mortar, Custom Building Products, Seal Beach, CA

2.3 GROUTS

A. Latex-Modified Sanded Grout:
   1. Description: Latex-modified, factory blended, mildew resistant, sanded, grout consisting of portland cement, graded quartz and additives; comply with ANSI A118.7.
   2. Latex Additive: Integral in mix type as recommended by latex mortar manufacturer.
   3. Color: As selected from manufacturer’s full color line.
   4. Acceptable Products:
      a. Laticrete PermaColor Grout.
      b. Keracolor S, Mapei Corporation.

c. Polyblend Sanded Grout, Custom Building Products, Seal Beach, CA.

B. Unsanded Latex-Modified Grout for Wall Tile:
   1. Description: Latex-modified, factory blended, mildew resistant, non-sanded, grout consisting of portland cement and additives; comply with ANSI A118.7.
   2. Location: Use at wall tile joints less than 1/8-inch.
   3. Color: As selected from manufacturer's full color line.
   4. Acceptable Products:
      a. PermaColor Grout, Laticrete.
      b. Keracolor U, Mapei Corporation.
      c. Polyblend Non-Sanded Grout, Custom Building Products, Seal Beach, CA.

2.4 ACCESSORIES

A. Thresholds: Solid surface material. Refer to Section 123663.

B. Joint Fillers and Sealants:
   1. Provide in accordance with Section 079200 - Joint Sealants.
   2. Color: Match grout.
   3. Ensure sealant is chemically compatible with tile, mortar, and grout.
   4. Ensure sealant can physically and chemically withstand environmental conditions normally expected at installation areas.

C. Adhesives & Sealants (including grouts): Only use adhesives and sealants (grouts) that comply with VOC limits of the requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168.
   1. Adhesives shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit requirements.
   2. Sealants shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

D. Primers: As recommended by manufacturer of mortar, grout, crack isolation, and sealant materials.
   1. Use primers that comply with VOC limits of the current requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1113 and Cal-GREEN Table 5.504.4.3 for VOC Content Limits for Architectural Coatings.

E. Substrate Fillers and Sealers: Materials as recommended by manufacturers of setting materials.

F. Grout Sealers: Water based silicone sealer, clear, VOC compliant, non-yellowing formula, to protect grout from staining.
   1. Use sealers that comply the more stringent with VOC limits of the current requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1113 and Cal-GREEN Table 5.504.4.3 for VOC Content Limits for Architectural Coatings.
   2. Acceptable Products:
      a. Laticrete 190 Grout Sealer.
      b. Miracle Sealants Grout Sealer.
      c. Grout Sealer, Aqua Mix.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with Work in accordance with Section 017300.

B. Verify that substrates comply with TCNA tolerance requirements.

3.2 PREPARATION

A. Clean substrates.

B. Prepare surfaces in strict accordance with instructions of manufacturer whose setting materials or additives are being used.

C. Acid Based Cleaners: Use not permitted.

D. Scarify concrete substrates with blast track equipment if necessary to completely remove curing compounds or other substances that would interfere with proper bond of setting materials. Clean and maintain substrate in condition required by setting material manufacturer.

E. Do not seal substrate unless required by manufacturer.

F. Prime substrate when required by manufacturer.

3.3 INSTALLATION

A. General:
   1. Install tile materials in accordance with ANSI A108 series, other referenced ANSI and TCNA specifications, and TCNA "Handbook for Ceramic Tile Installation", except for more stringent requirements of manufacturer or these Specifications.
   2. Tolerances:
      a. Lippage: Set top of tiles flush with each other. Exposed face offset between adjacent tiles (lippage); 3/64 inch maximum.
      b. Joint Width: 1/4 inch, +/- 1/32 inch, unless noted otherwise.
   3. Pattern: As indicated. Layout tile work and center tile fields in both directions in each space or on each wall area.
   4. Lay out tile to minimize cutting and to avoid tile less than half size.
   5. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size.
   6. Cut and fit tile at penetrations through tile. Do not damage visible surfaces. Carefully grind edges of tile abutting built-in items. Fit tile at outlets, piping and other penetrations so that plates, collars, or covers overlap tile.
   7. Extend tile work into recesses and under or behind equipment and fixtures, to form complete covering without interruptions, except as otherwise indicated. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
   8. Accurately form intersections and returns.

B. Thin-Set Method:
   1. Apply mortar with notched trowel using scraping motion to work material into good contact with surface to be covered.

2. Apply only as much mortar as can be covered within 20 to 30 minutes or while surface is still tacky.
3. Trowel small quantity of mortar onto back (back-butter) of each tile.
4. Set tiles in place and rub or beat with small beating block.
5. Beat or rap tile to ensure proper bond and also to level surface of tile.
6. Align tile to show uniform joints and allow to set until firm.
7. Clean excess mortar from surface of tile with wet cloth or sponge while mortar is fresh.

C. Threshold:
1. Install at exposed tile edges at doors, unless otherwise indicated.
2. Use same setting material as used for adjacent field tile.
3. Grouting And Pointing:
a. After tile has set sufficiently, fill joints with grout until flush with surrounding tile.
b. Point joints full and remove excess grout. Clean tile thoroughly.
c. Install sealant in vertical wall joints at interior corners.
d. Install tile with maximum 25 percent variation of specified grout joint width.

D. Expansion Joints:
1. Keep expansion joints free of mortar and grout.
2. Provide expansion joints directly over changes in material, over control and expansion joints in substrate, at juncture of floors and walls, at other restraining surfaces such as curbs, columns, bases, and wall corners, and where recommended by TCNA EJ171 Expansion Joint requirements.
a. Interior: 20-feet to 25-feet in each direction
b. Interior tile work exposed to direct sunlight or moisture: 8-feet to 12-feet in each direction.
c. Above-ground concrete slab substrates: 8-feet to 12-feet in each direction.
d. Perimeter Joints: Movement joints are required where tile work abut restraining surfaces such as perimeter walls, dissimilar floors, curbs, columns, pipes, ceilings, and where changes occur in backing materials, but not at drain strainers.
3. Install sealant in expansion joints.
4. Provide sealant material at items penetrating tile work, unless otherwise indicated.
5. Provide sealants and related materials in accordance with cited ANSI and TCNA requirements.

E. Joint Width: Maximum 1/8-inch; 1/16-inch minimum joint width.
1. Align tile joints when laying out tile pattern.
2. Account for US and metric dimensions.
3. Joints in tile and setting materials shall never be less than the width of the saw-cut control joint width.
4. Joints through tile work directly over structural joints shall never be narrower than the structural joint.

3.4 ADJUSTING

A. Sound tile after setting. Replace hollow sounding units.

3.5 CLEANING

A. Clean tile surfaces in accordance with manufacturer's instructions.

B. Clean excess mortar from surface with water as work progresses. Perform cleaning while mortar is fresh and before it hardens on surfaces.

C. Remove grout haze in accordance with grout manufacturer requirements. Do not use acids for cleaning.

D. Seal grout as soon as possible after grouting is completed to prevent permanent stains from being embedded in grout.

3.6 PROTECTION

A. Protect finished work from damage due to construction operations.

B. Prevent wheel and foot traffic from using newly tiled floors for at least 72 hours after installation.

C. Where temporary use of new floors is unavoidable, supply large, flat boards or plywood panels for walkways over kraft paper.

D. Protect work so that it will be without any evidence of damage or use at time of acceptance.

3.7 SCHEDULES

A. Floor Tile Installation Schedule:
   3.8 Thin Bed Floor Tile System:
   1. Description: Thin set.
   2. Mortar: Polymer Modified Thinset Dryset Mortar.
   3. Grout: Latex-modified.
   4. TCNA system: F113.

B. Wall Tile Installation Schedule:
   3.9 Interior Wall Tile System:
   1. Description: Interior partitions using gypsum board.
   2. Mortar: Polymer Modified Thinset Dryset Mortar.
   3. Grout: Unsanded latex-modified.
   4. TCNA System: W243.

END OF SECTION

SECTION 096500
RESILIENT FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Vinyl Composition Tile
   2. Wall Base
B. Related Sections:
   1. Section 096813 - Carpet Tile.

1.2 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data:
   1. Submit product information for each product.
      Include information for accessories and other required components.
      Include color charts for finish indicating manufacturer's full range of colors available for selection.
C. Samples:
   1. Illustrate: Style, pattern, color, and size.
   2. Verification of Selection:
      a. Quantity: Four
      b. Tile Plank: Submit actual unit.
      c. Resilient Sheet: Submit 12 inch square.
      d. Wall Base: Submit 12 inch lengths.
      e. Trim Components: Submit 12 inch lengths.
      f. Stair Nosings: Submit 12 inch lengths.
D. Submit following Informational Submittals:
   1. Certifications specified in Quality Assurance article.
   2. Qualification Data: Installer's qualification data.
   3. Manufacturer's Instructions:
      a. Application temperature and humidity range.
      b. Floor moisture content range.
      c. Bond and moisture test procedures including frequency and duration.
      d. Special procedures.
      e. Perimeter conditions requiring special attention.
E. Closeout Submittals:
   1. Submit under provisions of Section 017700.
   2. Maintenance data. Include polishing/waxing information.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain each type, color, and pattern of resilient flooring products from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the Work.
B. Installer Qualifications:
   1. Acceptable to manufacturer with experience on at least 5 projects of similar nature in past 5 years.
C. Regulatory Requirements:
   1. Comply with local regulations controlling use of volatile organic compounds for installation products.

2. Slip resistance: ASTM D2047, minimum static coefficient of friction; 0.6 for floors, 0.8 for ramps.

D. Certifications:
   1. Manufacturer's certification that products furnished for project meet or exceed specified requirements.
   2. Installer Certification: Manufacturer's certification attesting that Installer is trained and approved for application of materials.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.
B. Deliver materials to Job Site in manufacturer's unopened containers clearly marked with manufacturer's name, brand, size, thickness, grade, color, and design.

1.5 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Maintain minimum air and subfloor temperature required by adhesive manufacturer in spaces to receive products for at least 72 hours prior to installation, during installation, and for not less than 48 hours after installation.
   2. Store products in spaces where they will be installed for at least 72 hours before beginning installation to achieve temperature stability.
   3. Do not install products until they are at same air and subfloor temperature as space where they are to be installed.
   4. After installation, maintain minimum air and subfloor temperature of 55 degrees F in areas where work is completed.

1.6 SEQUENCING

A. Install products after other finishing operations, including painting, have been completed.
B. Do not install resilient products on top of concrete slabs until they are cured and are sufficiently dry to achieve bond with adhesive as determined by resilient material manufacturer's recommended bond and moisture test.
C. Coordinate installation of resilient base, reducer strips, nosings, and transition strips with installation of:
   1. Carpet tile specified in Section 096813.

1.7 MAINTENANCE

A. Maintenance Materials:
   1. Furnish under provisions of Section 013300.
   2. Furnish extra tile, sheet, and resilient base in quantity equal to 2 percent of total material furnished but not less than:
   3. 50 feet of each type and color base installed.
   4. Resilient Base and Sheet Flooring: Provide in roll form of each different composition and color installed.
   5. Store at job site where directed. Ensure boxes are identified by manufacturer, pattern, style, and color.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Products and Manufacturers: Refer to Finish List

2.2 MATERIALS

A. Vinyl Composition Tile
B. Resilient Base
    1. Provide in roll form to accommodate installation with minimum seaming.
    2. Corners: Field fabricated.

2.3 TRIM COMPONENTS

A. Resilient Flooring Reducer Strip:
    1. Description:
        a. Material: Homogeneous vinyl or rubber composition.
        b. Width: 1 inch, minimum.
        c. Align flush with top of resilient flooring on side of strip.
        d. Tapered or bullnose edge on side opposite of resilient flooring.
        e. Colors: Selected by Architect from manufacturer's full range of colors.

2.4 ACCESSORIES

A. Leveling, Patching and Underlayment Compounds:
    1. Cementitious types required by resilient flooring manufacturer; gypsum based compounds not allowed.
    2. Capable of being extended to a feather-edge.
    3. Capable of sustaining loads without indentation
B. Nosing Compound: Epoxy adhesive required by stair nosing manufacturer.
C. Primers and Adhesives:
    1. Water resistant, will not re-emulsify in presence of water vapor.
    2. Materials required by resilient product manufacturer for particular product and substrate moisture content and condition.
    3. Removable adhesive with antimicrobial additive; approved by resilient product manufacturer.
    4. Use primers that comply with VOC limits of the current requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1113 and Cal-GREEN Table 5.504.4.3 for VOC Content Limits for Architectural Coatings.
    5. Adhesives & Sealants: Comply with VOC limits of the current requirements of South Coast Air Quality Management District (SCAQMD) Rule No. 1168.
        a. Adhesives shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.1 Adhesive VOC Limit requirements.
        b. Sealants shall comply with VOC and chemical component limits of Cal-GREEN Table 5.504.4.2 Sealant VOC Limit requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions and proceed with work when substrates are acceptable to flooring manufacturer.
B. Site Verification of Conditions:
    1. Verify that concrete floor moisture content, alkalinity, carbonization, and dusting are within floor manufacturer's limitations.
    2. Verify that floor and wall surfaces to receive flooring and base are free of substances which may adversely affect adhesive and resilient materials.

3.2 PREPARATION

A. Comply with ASTM F710.

B. Bond and Moisture Tests:
   1. Perform in accordance with flooring manufacturer's requirements to determine suitability of concrete subfloor for receiving resilient flooring with regard to moisture content and curing compounds.
   2. Test concrete slabs in accordance with ASTM F710 to ensure moisture content is 3 percent or less.
   3. Test with calcium chloride in accordance with ASTM F1869 to ensure vapor transmission rate less than 4 pounds per 1000 sq. ft.
   4. Submit report to Owner. If subfloor's moisture vapor permeance is in excess of flooring manufacturer's limits for issuing warranty, prepare slab and apply vapor retarder underlayment system acceptable to manufacturer, or use manufacturer's adhesive for application on substrates containing excessive moisture.
C. Remove ridges, bumps, trowel marks and protrusions from substrate.
D. Fill depressions, low spots, cracks, joints, holes, indentations, and other defects with leveling and patching compounds. Trowel to smooth, flat surface producing substrate to within tolerance of 1/4 inch in 10'-0".
E. Clean substrate to remove paint, dirt, oil, grease, sealers, release agents, hardening compounds, curing compounds, residual adhesives, and harmful substances which could impair performance of adhesive materials used with resilient products.
F. Vacuum clean substrate.
G. Prime substrate in accordance with manufacturer's requirements.
H. Unroll rolled products minimum 24 hours before installation, unless not required by manufacturer.

3.3 INSTALLATION

A. General:
   1. Comply with Section 017300.
   2. Adhesive:
      a. Apply with notched trowel at rate and in pattern required by manufacturer.
      b. Gun application is not permitted.
      c. Apply to provide continuous bond between resilient material and substrate. Do not allow adhesive to bleed through joints.
      d. Spread only enough adhesive to permit installation of materials before adhesive's initial set.
      e. Allow solvent to flash off and adhesive to become tacky in accordance with manufacturer's requirements before applying resilient product.
   3. Scribing:
      a. Produce tight hairline joints.
      b. Scribe to walls, columns, cabinets, floor outlets, floor penetrations, and other appurtenances.
      c. Scribe, cut and fit exposed edges at adjoining construction and neatly abut.
B. Flooring—General:
   1. Set in place, press with roller to attain full adhesion and eliminate air bubbles and wrinkles. Use roller of weight required by resilient flooring manufacturer.
   2. Extend unexposed edges under set-on bases and similar trim work.
   3. Terminate at centerline of door openings where adjacent floor finish is dissimilar.
   4. Extend into closets and offsets and under movable equipment of rooms and spaces indicated or scheduled to receive flooring, including recessed covers within those spaces.
C. Vinyl Composition Tile Flooring:

1. Comply with manufacturer's installation requirements to match color, texture, and pattern by random selection of tile from different cartons and lots.
2. Lay plank symmetrically about center line of room or space. Adjust so edge units are not less than one-half of plank width.
3. Lay tile plank bottom surface securely bonded to substrate and top surface left smooth, clean, and free of imperfections.
4. Fit planks tightly so each unit is in contact with surrounding planks and end joints staggered.
5. Joint Pattern: Align long edges and install with end joints randomly staggered for wood floor appearance.

D. Resilient Base:
1. Use longest lengths possible; pieces less than 10 feet long are not permitted. Seams are not permitted between wall corners spaced less than 10 feet apart.
2. Fit joints straight, tight, and vertical.
3. Install on solid substrate backing.
4. Bond tight to wall and floor surfaces.
5. Scribe to door frames and other interruptions.
6. Outside Corners: Wrap base around corner after using cove base groover tool by Gundlach to make V-shaped vertical cut in back of base at corner.
7. Inside Corners:
   a. Butt and cope, or mitered.
   b. Do not wrap base around corners.
8. Align tops of adjacent sections.
9. Change from cove base to straight base at flooring transition strips.

E. Reducer and Transition Strips:
1. Provide reducer strips at unprotected edges, exposed edges, and where flooring [and carpet] terminates.
2. Center strip under door where flooring terminates at door openings.
3. Install in longest lengths practicable with minimal joints.
4. Fit joints tightly.
5. Secure resilient strips to subfloor by using adhesive.

3.4 CLEANING

A. Immediately remove excess adhesive from surfaces without damage.
1. Replace scuffed, scratched, broken, and discolored products.
2. Re-install loose products.
3. Clean surfaces in accordance with manufacturer's requirements. Do not use materials and methods which may damage finish and surrounding construction.

3.5 PROTECTION

A. Prohibit traffic on floor finish for minimum of 72 hours after installation.
B. Protect work from damage from subsequent construction operations so there will be no indication of use and damage at time of acceptance.

END OF SECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
1. Tile carpet
2. Adhesive.
3. Accessories.

B. Related Work:

1. Section 024119 "Selective Demolition" for removing existing floor coverings.
2. Section 060140 “Interior Architectural Woodwork Restoration” for wood wall base and accessories installed with carpet.

1.2 SYSTEM DESCRIPTION

A. Regulatory Requirements:

1. Ensure flammable components comply with applicable portions of local, state, and federal codes, laws, and ordinances for toxicity, flame spread and smoke developed indices.
2. Fire Resistance Ratings: Provide carpet and underlayment which complies with following requirements as determined by independent testing laboratory acceptable to authorities having jurisdiction:
   a. Critical Radiant Flux: ASTM E648, Class I, 0.45 watts/cm^2 minimum.
   b. Where indicated, provide carpet identical to those of assemblies tested for fire response per NFPA 253 by a qualified testing agency.
3. Accessibility: Carpet construction maximum total pile height/ thickness = ½ inch.
4. Comply with local regulations controlling use of volatile organic compounds for installation products.

1.3 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project Site.

1. Review methods and procedures related to carpet installation including, but not limited to, the following:

   a. Review delivery, storage, and handling procedures.
   b. Review ambient conditions and ventilation procedures.
   c. Review subfloor preparation procedures.

1.4 SUBMITTALS

A. Product Data: Submit product data for each product.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet.
2. Carpet type, color, and dye lot.
3. Locations where dye lot changes occur.
4. Seam locations, types, and methods.
5. Type of subfloor.
6. Type of installation.
7. Pattern type, repeat size, location, direction, and starting point.
8. Pile direction.
9. Type, color, and location of insets and borders.
10. Type, color, and location of edge, transition, and other accessory strips.
11. Transition details to other flooring materials.
12. Type of carpet cushion.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet: qty (4) 24-inch- (300-mm-) square samples.

D. Submit the following Informational Submittals:
1. Certifications specified in Quality Assurance article.
2. Qualification Data: Manufacturer’s and installer’s qualification data.
3. Manufacturer’s Instructions.

E. Closeout Submittals:

1. Maintenance Data: Include the following in maintenance manuals:
   a. Methods for maintaining carpet, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
   b. Precautions for cleaning materials and methods that could be detrimental to carpet.
2. Warranty: submit specified warranty.

1.5 QUALITY ASSURANCE

A. Single Source Responsibility: Furnish carpet from one manufacturer for entire Project, unless otherwise acceptable to Architect.

B. Installer Qualifications:
1. Installer acceptable to manufacturer with experience on at least 5 projects of similar nature in past 5 years.
2. Installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II, Master II certification level.

C. Product Test Reports: For carpet, for tests performed by a qualified testing agency.
1. Manufacturer’s certification that carpet furnished for project meets one of the following requirements:

a. Indoor Air Quality Carpet Testing, Carpet and Rug Institute, include CRI Certification number (Green label).
b. EPA Guidelines for Total Volatile Organic Emissions.

2. Antimicrobial: Environmental Protection Agency registration numbers for antimicrobial agent in products furnished.

1.6 MOCK-UPS

A. Provide sample installation 10 feet by 10 feet wide as directed:
1. Show installation pattern.
2. Show color range of carpet.
3. Show transition to existing tile floor.

1.7 EXTRA STOCK MATERIALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish extra carpet in quantity equal to 5 percent of total material furnished, but not less than 10 square yards, exclusive of carpet needed for proper installation, waste and usable scraps.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to project site in manufacturer's unopened containers clearly marked with manufacturer's name, brand, size, thickness, grade, color and design.

1.9 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet and carpet pad until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Store carpet materials in spaces where they will be installed for at least 48 hours prior to installation.

1.10 WARRANTY

A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, loss of tuft bind strength, excess static discharge, and delamination.

3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WOVEN CARPET

A. Basis-of-Design Product: Per Materials Finish List

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds:
1. pre-mixed latex recommended by carpet manufacturer.
2. Gypsum based products not allowed.
3. Compatible with adhesives and curing and sealing compound on concrete.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet and is recommended or provided by carpet manufacturer.

1. Use adhesives with VOC content not more than 50 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet performance. Examine carpet for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet manufacturer.
2. Subfloor finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" for slabs receiving carpet.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 7.3, "Site Conditions; Floor Preparation," and with carpet manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider, and protrusions more than 1/32 inch (0.8 mm), unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet.

3.3 INSTALLATION

A. General:
1. Comply with CRI 104, carpet manufacturer's written installation instructions, and shop drawings.
2. Install carpet square and aligned with adjacent surfaces.
3. Layout carpet rolls and verify carpet match before cutting.
4. Double cut carpet, to allow intended seam and pattern match. Make cuts straight, true and unfrayed.
5. Lay carpet with run or pile in same direction as anticipated traffic.
6. Lay carpet tight and flat with uniform appearance.
7. Do not change run of pile where carpet is continuous through wall opening from one room into another room.
8. Cut and fit carpet around interruptions and penetrations.
9. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
10. Do not bridge expansion joints with carpet.
11. Seam Location:
    a. Locate seam in area of least traffic.
    b. Lay length seams in same direction with each space.
    c. Center seams directly under doors.
12. Apply seam adhesive and press by hand to produce even pile.
13. Install edge strip with carpet terminates at other floor coverings.

3.4 CLEANING AND PROTECTING

A. Perform the following operations immediately after installing carpet:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
2. Remove yarns that protrude from carpet surface.
3. Vacuum carpet using commercial machine with face-beater element.

B. Protect installed carpet to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet manufacturer and carpet adhesive manufacturer

END OF SECTION 096813

SECTION 099113
EXTERIOR PAINTING

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 surface preparation and the application of paint systems on the following exterior substrates:

1. Stucco Walls
2. Exposed wood rafter tails, underdecking, and roof facias
3. Exterior wood doors and window frames
4. Exterior decorative metal guards/ grilles
5. Metal gutters and roofing accessories
6. Exterior steel posts, fencing, gates

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include preparation requirements and application instructions.
2. Indicate VOC content.

B. Samples: For each type of topcoat product.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

E. Product Schedule: Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 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. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system.

a. Vertical and Horizontal Surfaces: Provide samples of at least 25 sq. ft..
b. Other Items: Architect will designate items or areas required.

2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Dunn Edwards Paint Corporation
2. Benjamin Moore and Company
3. Sherwin Williams

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturer for use in paint system and on substrate indicated.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

C. Colors: As indicated in a color schedule and as approved by Architect and Owner's Representative.

2.3 EXTERIOR PAINT SYSTEMS:

A. Exterior Painted CMU, Gutters, Downspouts, Wood Fascia and Overhangs, Exterior Wood Trim:

1. First Coat: ULTRA-GRIP Premium, Acrylic Multi-Purpose Primer (UGPR00 Series)

2. Second Coat: SPARTASHIELD, Exterior 100% Acrylic Eggshell Paint (SSHL30)

3. Third Coat: SPARTASHIELD, Exterior 100% Acrylic Eggshell Paint (SSHL30)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and Concrete Masonry Units): 12 percent.
4. Wood: 15 percent.
5. Portland Cement Plaster: 12 percent.
6. Gypsum Board: 12 percent.

C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.

D. Exterior Gypsum Board Substrates: Verify that finishing compound is dry and sanded smooth.

E. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers. Notify Architect and Owner's Representative if conditions detrimental to the proper and timely completion of the Work exist. Beginning of Work will be interpreted as applicator's acceptance of surfaces and conditions within any particular area and will constitute acceptance of conditions and responsibility for the ultimate finish.

F. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protection: Provide covers and sacrificial coatings necessary to prevent damage to substrates, finish work, furniture, and equipment due to surface preparation, painting, and finish work of this Section. Remove temporary protection provided by others for the protection of their work, after completion of painting operations. Provide “Wet Paint” signs as required to protect newly painted finishes.

B. Comply with manufacturer's written instructions applicable to substrates and paint systems indicated.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

D. All surfaces must be clean and dry prior to application of paint and surface treatments. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems specified in this Section.

E. Previously coated surface: Remove poorly bonded and friable coatings and deteriorated portions of substrate, including but not limited to oxidized metal and rotted wood, to expose sound substrate. Sand areas where coatings have been removed to establish a maximum amplitude of 5 mils abrupt change in surface profile.

F. Establish sufficient amplitude in substrate profile to ensure optimum mechanical bond of each coat of paint applied, but as not to alter the texture and appearance of the final finish.

G. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

H. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

I. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 3, “Power Tool Cleaning”.

J. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

K. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

L. Aluminum Substrates: Remove loose surface oxidation.

M. Wood Substrates:

1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
2. Sand surfaces that will be exposed to view, and remove sanding dust.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 REQUIREMENTS FOR LEADED PAINT SURFACES

A. Lead-based paint is likely present on interior and exterior surfaces of the building. It is the Contractor’s responsibility to ensure these materials are handled in accordance with all applicable State and Federal regulations to accomplish the work.

B. Work of this section shall be conducted in compliance with CAL-OSHA requirements provided in 8 CCR 1528, 5144, 5194, and 5155. These provisions include, but are not limited to, personal exposure air monitoring, protective clothing, training, containment, respiratory protection, worker change areas and medical examinations.

3.4 INSTALLATION

A. Apply paints in accordance with manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. 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.

D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

    a. Equipment, including panelboards and switch gear.
    b. Uninsulated metal piping.
    c. Uninsulated plastic piping.
    d. Pipe hangers and supports.
    e. Metal conduit.
    f. Plastic conduit.
    g. Tanks that do not have factory-applied final finishes.

3.5 FIELD QUALITY CONTROL

A. 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. Contractor shall 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, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

B. Number of coats specified for paint systems in Part 2 is minimum. Provide additional coats as necessary to provide a durable coating complying with application and appearance requirements.

3.6 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

    1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
    2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
    3. Allow empty paint cans to dry before disposal.
    4. Collect waste paint by type and deliver to recycling or collection facility.

B. Clean up spilled and splattered paint daily. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 EXTERIOR PAINTING SCHEDULE

A. Refer to Materials Finish List

END OF SECTION

SECTION 099123
INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes surface preparation and the application of paint systems on the following interior substrates:
   1. Gypsum Board walls and ceilings
   2. Wood casings, base, trims, and frames
   3. Interior wood doors and windows
   4. Metal doors and frames
   5. Cover plates, grilles, and miscellaneous accessories at walls and ceilings
   6. Millwork

B. Related Requirements:

   1. Section 099113 – “Exterior Painting”

   2. Section 099300 "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

   1. Include preparation requirements and application instructions.
   2. Indicate VOC content.

B. Samples for Initial Selection: Provide samples of each color selected per Finish Schedule. Material Samples to be applied with texture to simulate actual conditions on representative samples of the actual substrate.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
   1. Submit three 12-inch by 12-inch samples of each color and material with texture to simulate actual conditions.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each Sample with date of application, color and sheen information, location and application area.
   4. Resubmit samples as requested by Architect and Owner’s Representative until acceptable sheen, color, and texture is achieved.

D. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 25 sqft.
      b. Other items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.

a. If preliminary color selections are not approved, apply additional mockups of additional colors selected at no added cost to Owner.

3. Approval of mockups does not constitute deviations for the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.3 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. Paint Products: 5 percent, but not less than 1 gal. of each material and color applied.

2. Supply extra paints from same production lots of color runs used in the Work, factory sealed and labeled.

3. Deliver materials and an inventory list to project premises prior to Substantial Completions and store as directed by the Owner's Representative.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has successfully completed coating system applications similar in material and extent to those indicated for the Project.

B. Comply with all Federal, State, and Local regulations regarding but not limited to Volatile Organic Compounds (VOCs).

C. Sole Source: Provide primers and paint produced by same manufacturer for each paint system. Use only thinners recommended by the manufacturer and only within recommended limits.

D. Coordination of Work: Ensure compatibility of total coating systems for various undercoats and substrates.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas, away from heat and direct rays of the sun with ambient temperatures continuously maintained at not less than 45 deg F.

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.
3. Deliver all materials to the site in sealed manufacturer's containers with legends and labels intact.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Dunn Edwards Paint Corporation
2. Benjamin Moore and Company
3. Sherwin Williams

B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

A. Material Compatibility:

1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

B. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

C. Colors: As indicated in a color schedule and as approved by Architect and Owner's Representative.

2.3 INTERIOR PAINT SYSTEMS

A. Interior Painted Doors, Painted Door Jambs, Painted Window Frames

1. First Coat: ULTRA-GRIP Premium, Acrylic Multi-Purpose Primer (UGPR00 Series)

2. Second Coat: ARISTOSHIELD, Interior/Exterior Semi-Gloss Paint (ASHL50)

3. Third Coat: ARISTOSHIELD, Interior/Exterior Semi-Gloss Paint (ASHL50)

B. Interior Doors with Clear Finish

1. First Coat: DEFT Clear Wood Finish Waterborne Sem-Gloss (10801)

2. Second Coat: DEFT Clear Wood Finish Waterborne Sem-Gloss (10801)

C. Painted Drywall and CMU

1. First Coat: ULTRA-GRIP Premium, Acrylic Multi-Purpose Primer (UGPR00 Series)

2. Second Coat: SPARTAWALL Interior Low Sheen Paint (SWLL40)

3. Third Coat: SPARTAWALL Interior Low Sheen Paint (SWLL40)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Concrete: 12 percent.
2. Fiber-Cement Board: 12 percent.
3. Masonry (Clay and CMUs): 12 percent.
4. Wood: 15 percent.
5. Gypsum Board: 12 percent.
6. Plaster: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers. Notify Architect and Owner's Representative if conditions detrimental to the proper and timely completion of the Work exist. Beginning of Work will be interpreted as applicator's acceptance of surfaces and conditions within any particular area and will constitute acceptance of conditions and responsibility for the ultimate finish.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Protection: Provide covers and sacrificial coatings necessary to prevent damage to substrates, finish work, furniture, and equipment due to surface preparation, painting, and finish work of this Section. Remove temporary protection provided by others for the protection of their work, after completion of painting operations. Provide "Wet Paint" signs as required to protect newly painted finishes.

B. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.

C. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

D. All surfaces must be clean and dry prior to application of paint and surface treatments Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

E. Previously coated surface: Remove poorly bonded and friable coatings and deteriorated portions of substrate, including but not limited to oxidized metal and rotted wood, to expose sound substrate. Sand areas where coatings have been removed to establish a maximum amplitude of 5 mils abrupt change in surface profile.

F. Establish sufficient amplitude in substrate profile to ensure optimum mechanical bond of each coat of paint applied, but as not to alter the texture and appearance of the final finish.

G. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

H. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

I. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
1. SSPC-SP 3

J. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

K. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

L. Aluminum Substrates: Remove loose surface oxidation.

M. Wood Substrates:

1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Prime edges, ends, faces, undersides, and backsides of wood.
4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. 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.

D. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed in occupied spaces:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.
f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

2. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIELD QUALITY CONTROL

A. 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. Contractor shall 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 recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
3. Allow empty paint cans to dry before disposal.

4. Collect waste paint by type and deliver to recycling or collection facility.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

END OF SECTION

SECTION 102113
TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Compact Laminate / Solid Phenolic toilet compartments.

1.2 SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Submit manufacturer's shop drawings for each product specified, including the following:
1. Plans, elevations, details of construction and attachment to adjacent construction.
2. Show anchorage locations and accessory items.
3. Verify dimensions with field measurements prior to final production of toilet compartments.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

E. CLOSEOUT SUBMITTALS
1. Maintenance data.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 10 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

C. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.

D. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA and ICC/ANSI A117.1 requirements as applicable.

1.4 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.

B. Handling: Handle materials to avoid damage.

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's recommended limits.

1.7 SEQUENCING

A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.8 WARRANTY

A. Manufacturer's Warranty: Manufacturer's standard 25 year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship. Manufacturer's standard 1 year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Products: Based on the quality and performance requirements of the project, specifications are based solely on the products of Bobrick Washroom Equipment, Inc. www.bobrick.com. Location of manufacturing shall be the United States.

B. Substitutions: The Architect will consider products of comparable manufacturers as a substitution, pending the Contractor's submission of adequate documentation of the substitution in accordance with procedures in Division 1 of the Project Manual. Documentation shall include a list of five similar projects of equivalent size where products have been installed for a minimum of two years, and manufacturer's certification that products are fabricated in the United States.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 COMPACT LAMINATE (SOLID PHENOLIC), MOISTURE RESISTANT SUBSTRATE

A. Compact Laminate (Solid Phenolic) Toilet Partitions: Basis of Desing - Bobrick DuraLineSeries.
   1. Design Type:
      a. Standard Height
         1) Door/panel height: 58 inches
         2) Floor clearance: 12 inches
   2. Privacy Style Partitions: No sightlines with gap-free interlocking doors and stiles routed 0.300 inches (7.6 mm) from the edge to allow 0.175 inch (4.4 mm) overlap to prevent line-of-sight into the toilet compartment. Privacy strips fastened or adhered onto the partition material are not acceptable.
   3. Mounting Configuration:
      a. Floor-mounted, overhead-braced with anodized aluminum headrails, 0.065 inch (1.65 mm) thick with anti-grip profile.
         1) Stile Maximum Height: 83 inches

B. Materials: Solidly fused plastic laminate with matte-finish melamine surfaces; integrally bonded colored face sheets and black phenolic-resin core.

C. Edges: Black; brown edges not acceptable.

D. Color:
   1. As selected by Architect from manufacturer's standard DuraLineSeries Compact Grade Laminate color range.

E. Finished Thickness:
   1. Stiles and Doors: 3/4 inch (19 mm).
   2. Panels and Screens: 1/2 inch

F. Stiles: Floor-anchored stiles furnished with expansion shields and threaded rods.
   1. Leveling Devices: 7 gauge, 3/16 inches (5 mm) thick, corrosion-resistant, chromate-treated, double zinc-plated steel angle leveling bar bolted to stile; furnished with 3/8 inch (10 mm) diameter threaded rods, hex nuts, lock washers, flat washers, spacer sleeves, expansion anchors, and shoe retainers.
   2. Stile Shoes: One-piece, 22 gauge (0.8 mm), 18-8, Type 304 stainless steel, 4 inch (102 mm) height; tops with 90 degree return to stile. One-piece shoe capable of adapting to 3/4 inch (19 mm) or 1 inch (25 mm) stile thickness and capable of being fastened (by clip) to stiles starting at wall line

G. Wall Posts: Pre-drilled for door hardware, 18-8, Type 304, 16 gauge (1.6 mm) stainless steel with satin finish; 1 inch (25 mm) x 1-1/2 inches (38 mm) x 58 inches high (1473 mm).

H. Anchors: Expansion shields and threaded rods at floor connections as applicable. Threaded rods secured to supports above ceiling as applicable. Supports above ceiling furnished and installed as Work of Section 05 50 00 - Metal Fabrications.

I. Hardware:
1. Compliance: Operating force of less than 5 lbs. (2.25 kg).
2. Emergency Access: Hinges, latch allow door to be lifted over keeper from outside compartment on inswing doors.
3. Materials: 18-8, Type 304, heavy-gauge stainless steel with satin finish.
4. Doorstops: Prevents inswinging doors from swinging out beyond stile; on outswing doors, doorstop prevents door from swinging in beyond stile.
5. Fastening: Hardware is secured to door and stile with pin-in-head Torx stainless steel machine screws. Hinges, latch and optional door stops secured to door with pin-in-head Torx stainless steel machine screws into factory-installed, threaded brass inserts. Fasteners for hinges latch and optional door stops secured directly into core not acceptable.
   Threaded Brass Inserts: Factory-installed; withstand direct pull force exceeding 1500 lbs. (680 kg) per insert.
6. Clothes Hooks: Projecting no more than 1-1/8 inch (29 mm) from face of door.
7. Door Latch: Track of door latch prevents inswing doors from swinging out beyond stile; on outswing doors, door keeper prevents door from swinging in beyond stile; 16 gauge (1.6 mm) sliding door latch, 14 gauge (2 mm) keeper.
8. Locking: Door locked from inside by sliding door latch into keeper
9. Hinge Type:
   a. Full-Height Institutional Hinge.
      1) Hinges: 16 gauge (1.6 mm) stainless steel, self-closing, 3 section hinges
10. Mounting Brackets:
   a. Full-Height.
      1) Mounting Brackets: 18 gauge (1.2 mm) stainless steel and extend full height of panel.
      2) U-Channels: Secure panels to stiles.
      3) Angle Brackets: Secure stiles-to-walls and panels to walls

2.3 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

D. Door Size and Swings: Unless otherwise indicated, provide 24-inch-(610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch-(914-mm-) wide out-swinging doors with a minimum 32-inch-(813-mm-) wide clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare substrates including but not limited to blocking and supports in walls and ceilings at points of attachment using methods recommended by the manufacturer for achieving the best result for the substrates under the project conditions.
   1. Inspect areas scheduled to receive compartments for correct dimensions, plumbness of walls, and soundness of surfaces that would affect installation of mounting brackets.
   2. Verify spacing of plumbing fixtures to assure compatibility with installation of compartments.

B. If preparation is the responsibility of another installer, notify Architect in writing of deviations from manufacturer's recommended installation tolerances and conditions.

C. Do not proceed with installation until substrates have been properly prepared with blocking and supports in walls and ceilings at points of attachment and deviations from manufacturer's recommended tolerances are corrected. Commencement of installation constitutes acceptance of conditions.

3.2 INSTALLATION

A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
   1. Verify blocking and supports in walls and ceilings has been installed properly at points of attachment.
   2. Verify location does not interfere with door swings or use of fixtures.
   3. Use fasteners and anchors suitable for substrate and project conditions
   4. Install units rigid, straight, plumb, and level.
   5. Conceal evidence of drilling, cutting, and fitting to room finish.
   6. Test for proper operation.

3.3 ADJUSTING, CLEANING AND PROTECTION

A. Adjust hardware for proper operation after installation. Set hinge cam on in-swinging doors to hold doors open when unlatched. Set hinge cam on out-swinging doors to hold unlatched doors in closed position.

B. Touch-up, repair or replace damaged products.

C. Clean exposed surfaces of compartments, hardware, and fittings.

END OF SECTION

SECTION 102800
TOILET ROOM ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Toilet accessories
2. Supplementary parts and components, such as inserts, clips, anchors, fasteners, and other miscellaneous supports required for a complete installation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For each exposed product and for each finish specified, full size.

1. Approved full-size Samples will be returned and may be used in the Work.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.5 WARRANTY

A. Warranty Period: Five years from date of Substantial Completion.

1.6 ACCESSIBILITY REQUIREMENTS

A. Toilet accessories required to be accessible shall be mounted at heights according to CBC Chapter 11B requirements.

PART 2 - PRODUCTS

2.1 FABRICATION

A. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide a minimum of **six** keys to Owner's representative.

2.2 MATERIALS

A. Stainless steel: AAMA Type 302/304 complying with ASTM A 167.

B. Sheet steel:
1. Cold-rolled commercial quality, complying with ASTM A 336, 20 gage minimum.
2. Galvanized steel: ASTM A 653 LQ, G60 zinc coating, 20 gage minimum.

C. Mirrors: 1/4-inch "Silvering Quality" float glass with silver coating, copper protective coating and 2-mil thick protective paint; complying with CS 27.

D. Mounting devices: Galvanized steel.

E. Fasteners: Spanner head design stainless steel fasteners where exposed; may be galvanized steel where concealed.

2.3 FABRICATION

A. Fabricate units with seamless one piece flanges on exposed faces.
1. Miter corners, weld and grind smooth and flush with parent metal so that welds are invisible on exposed surfaces.
2. Open joints (not fully welded) on exposed surfaces are not acceptable.
3. Conceal anchoring devices.

B. Hang doors or panels on continuous stainless steel piano hinges.

C. Grind edges smooth, both inside and out.

D. Finish exposed surfaces with an AISI No. 4 finish running in the same direction (horizontal or vertical) for all accessories, except where a knurled surface is specified for grab bars.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine adjacent construction and supports.

B. Verify that attachment surfaces are within allowable tolerances, plumb, level, clean, will provide a solid anchoring surface, and that other conditions detrimental to the proper or timely completion of this work are corrected before proceeding with installation.

3.2 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

C. Shower Seats: Install to comply with specified structural-performance requirements.

D. Drill holes to the correct size and location. Install accessories plumb, level and equally spaced (where applicable).
1. Where accessories are attached to toilet compartments, do not “thru-bolt” but drill and tap partition reinforcement
2. Provide templates of accessories for drilling and tapping required in Section 10 2113.

E. When installed in ceramic tile surfaces, coordinate accessory location with the tilework so that the top and one side (closest to the door) of the accessory will align with a tile joint.

F. Attach accessories securely with screws or bolts to steel studs or backing plates. Do not use Molly or toggle bolts in gypsum board.

3.3 ACCESSORY SCHEDULE

A. Refer to Plumbing Accessories Schedule and cutsheets included within the Project Manual.

END OF SECTION

SECTION 104400
FIRE PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Fire extinguishers and cabinets.
   1. Recessed or semi-recessed cabinets in public accessible areas.
   2. Bracket mount in Electrical, Telecom, Mechanical and similar special access spaces.

1.2 DEFINITIONS

A. Where indicated on Drawings, abbreviation "FEC" defines fire extinguisher and cabinet and abbreviation "FE" is for fire extinguisher without cabinet.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 013300.
B. Product Data:
   1. Furnish manufacturer's descriptive literature.
   2. Include physical dimensions, operational features, color and finish, anchorage details, material descriptions, and type of hardware.
C. Shop Drawings: Include rough-in measurements, locations, and details for cabinets.
D. Samples: Submit sample of manufacturer's standard finish and color on actual base metal.
E. Submit following Informational Submittals:
   1. Certificates: Submit certification attesting compliance with UL and NFPA requirements.
   2. Manufacturer's instructions: Submit installation instructions for fire extinguisher cabinets.

1.4 QUALITY ASSURANCE

A. Single Source Responsibility: Obtain products in this Section from one manufacturer.
B. Certifications:
   1. Provide extinguishers which are UL listed and bear UL rating for type and classification.
   2. Conform to CCR, Title 19 requirements for extinguishers.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 016600.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Do not store products subject to freeze damage in environments where damage could occur.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Amerex
   2. Larsen's Manufacturing Company.
   3. Potter Roemer.

2.2 FIRE EXTINGUISHERS

A. Multi-Purpose Dry Chemical Type (Siliconized Mono Ammonium Phosphate) with Pressure Gage.
   1. Capacity: 5.0 pounds.
   2. UL Rating: 2A-10B:C.
   3. Acceptable Product: Amerex B402/T

2.3 CABINETS

A. Manufacturer: Potter Roemer. Do not use JL Industries Cabinet.
B. Fire Extinguisher Cabinet:
   1. Formed sheet metal 20 gage prime painted steel, epoxy finished interior.

2. Recessed type.
3. Cabinet Construction: Nonrated, except provide rated cabinet when recessed into rated partitions of same rating as partition.
4. Size to accommodate fire extinguisher and accessories.

C. Trim: Flat, stainless steel.
D. Door:
1. Material: Stainless steel.
2. Thickness: 20 gage minimum, reinforced for flatness and rigidity.
3. Latch: Lock, Potter Roemer LL24.
4. Door style: Break glass with lock or break rite handle.
E. Mounting Hardware: Appropriate to cabinet.
F. Graphic Identification: Red vertical letters on cabinet. Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.

2.4 ACCESSORIES

A. Fire Extinguisher Brackets: Larsen's Manufacturing Company, Minneapolis, MN "B" series full length wall brackets, size as required for cylinder used.

2.5 FABRICATION

A. Form body of cabinet with tight inside corners and seams.
B. Predrill holes for anchorage.
C. Form perimeter trim and door stiles by welding, filling, and grinding smooth.
D. Hinge doors for 180 degree opening with continuous piano hinge. Provide nylon roller type catch.

2.6 FINISHES

A. Extinguisher: Red enamel.
B. Cabinet Trim and Door: UNS S30400 stainless steel with No. 4 finish.
C. Cabinet Interior: White epoxy.

PART 3 - EXECUTION

3.5 EXAMINATION

A. Examine conditions and proceed with Work when substrate conditions are acceptable.
B. Verify rough openings for cabinets are correctly sized and located.

3.6 INSTALLATION

A. Install in accordance with manufacturer's printed instructions.
B. Install cabinets plumb and level in wall openings at locations indicated on Drawings.
C. Securely attach cabinets and mounting brackets in place to wall blocking.

END OF SECTION

SECTION 123661
SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid surface material countertops.
2. Solid surface material backsplashes.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ICPA SS-1.
1. Type: Provide Standard type unless Special Purpose type is indicated.
2. Colors and Patterns: As indicated on Drawings and Material Finish List.

B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.

C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 COUNTERTOP FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Grade: Premium

2. Front: Straight, slightly eased at top with separate apron.
3. Backsplash: Straight, slightly eased at corner
4. End Splash: None.

B. Countertops: 3/4-inch thick, solid surface material with front edge built up with same material

C. Backsplashes: 3/4-inch thick, solid surface material.

D. Joints: Fabricate countertops without joints.

E. Cutouts and Holes:

1. Grommet locations: Make cutouts for fixtures using template or pattern. Form cutouts to smooth, even curves.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer.

B. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

C. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions.

D. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.

E. Install backsplashes and end splashes by adhering to wall and countertops with adhesive.

F. Install aprons to backing and countertops with adhesive.

G. 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.

H. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

END OF SECTION

SECTION 323119
DECORATIVE METAL FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Decorative steel fences.
   2. Gates.
   3. Gate operators, including controls.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For fencing and gates.

   1. Include plans, elevations, sections, and attachment details.
   2. Include diagrams for power, signal, and control wiring.

C. Samples: For each fence material and for each color specified.

1.4 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

B. Product test reports.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance data.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

PART 2 - PRODUCTS

2.1 BASIC MATERIALS AND ACCESSORIES

A. Steel Tubing: ASTM A500, cold-formed, Grade A or B, welded or seamless. All drawing dimensions are to outside edges.
   1. All tubular steel fence members to be 12 gauge steel, unless otherwise noted on plans or details.

B. Steel Plate: ASTM A36.

C. Fastenings: All bolts, nuts, screws, clips, washers, and any other fastenings necessary for proper erection of items specified herein.
   1. Ferrous Metal: Metalized
   2. Other Metals: Zinc-coated or cadmium-plated for exterior use.
   3. All bolts to be grade 5 or better and coated / plated or a non-rusting material.

D. Concrete Inserts: ASTM A47 malleable iron or ASTM A27 cast steel threaded or wedge type, galvanized ferrous castings. Provide ASTM A153 hot-dipped galvanized bolts, washers and shims as required.

E. Welding Electrodes: AWS Code D1.0.

2.2 SPECIALLY FABRICATED PRODUCTS

B. Ferrous Members:
   1. Bar Members: Mild steel with all connections welded.
   2. Pipe Members: I.P.S. unless otherwise noted. Fabricate in largest sections practicable. Weld all shop joints. Conceal all field joints with sleeves and pins.

2.3 FINISHES

A. Metalizing: All metalwork shall be metalized per all applicable ASTM standards.

B. Primer: Primer to meet Federal Specification TT-P-645 and formulated to comply with air pollution regulations as delivered and must not be thinned.

C. Paints: As specified in Drawings

D. Finish all brackets, tabs, screws, bolts, latches, hinges, etc, with two (2) coats of zinc oxide primer and two (2) coats of a rust inhibitor, finish color to match metalwork.

PART 3 - EXECUTION

3.1 CONDITION OF SURFACE

A. General: Inspect all surfaces to receive steel connections and report all defects which would interfere with this installation. Starting work implies acceptance of surfaces as satisfactory.

3.2 FABRICATION

A. General: Fabricate all items in the shop and erected in the field by workmen specifically skilled in such work. Provide all surfaces free of file marks, dents; hammer marks (except for required textures), wire edges or any unsightly surface defects.

3.3 WORKMANSHIP

A. Layout: Set all work plumb, true, rigid, and neatly trimmed out. Miter corners and angles of exposed moldings and frames unless otherwise noted.

B. Fitting: Fit exposed connections accurately together to form tight hairline joints.

3.4 ATTACHMENTS

A. General: Do all cutting, shearing, drilling, punching, threading, tapping, etc., that is required for site metalwork or for attachment of adjacent work. Drill or punch holes; do not use cutting torch. Shearing and punching shall leave true lines and surfaces.

3.5 FASTENERS

A. General: Provide all lugs, clips, anchors, and miscellaneous fastenings necessary for the complete assembly and installation. Conceal all fastenings where practicable. Thickness of metal and details of assembly and supports shall give ample strength and stiffness. Form joints exposed to weather to exclude water.

3.6 OTHER CONNECTORS

A. General: Make all permanent connections in ferrous metal surfaces using welds where at all possible. Do not use bolts or screws where they can be avoided.

3.7 WELDING

A. Standards:

1. AWS Code D1.0. (ASTM A36 for structural steel.)
2. Welding only by operators experienced in the type of work indicated.

B. Preparation: Remove all rust, paint, scale and other foreign matter. Wire brush all flame-cut edges. Clamp members as required and alternate welds, all as necessary to prevent warping or misalignment.

C. Exposed Welds: Uniformly make and ground smooth all welds normally exposed to view in the finished work.

D. Galvanized Units: Do not weld after fabrication.

E. Faulty and Defective Welding: Chip out and replace all welding showing cracks, slag inclusion, lack of fusion, bad undercut or other defects ascertained by visual or other means of inspection. Replace and re-weld at no cost to Owner.

F. Field Welding:
1. Procedure: Comply with AWS code of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
2. Protection: Protect all adjacent surfaces from damage due to weld sparks, spatter, or tramp metal.

3.8 BOLTED, SCREWED, AND RIVETED CONNECTIONS

A. Bolts: Use bolts for field connections only and as detailed on Drawings. Provide washers under all heads and nuts bearing on (wood). Draw all nuts tight and nick threads of permanent connections to prevent loosening. Use beveled washers where bearing is on sloped surfaces.

B. Screws: For permanent connections (in ferrous metal), use flat head type, countersunk, with screw slots filled and finished smooth and flush.

C. Rivets: Machine drive tight, all rivets, with heads centered, countersunk, and finished flush and smooth.

3.9 SURFACE TREATMENT AND PROTECTIVE COATINGS

A. Cleaning:
1. Thoroughly clean all mill scale, rust, dirt, grease and other foreign matter from ferrous metal prior to any galvanizing, (hot phosphate treatment) or painting.
2. Conditions which are too severe to be removed by hand cleaning methods, shall be cleaned per SSPC "Surface Preparation Specifications", "Solvent Cleaning, SSPC SP-1"; "Power Tool Cleaning, SSPC-SP"; or "Brush-Off Blast Cleaning, SSPC-SP", as required.

B. Exterior Ferrous Metal:

1. Grind smooth all welds, burrs, and rough surfaces. Clean and hot-phosphate treat completed assembly. Hot phosphate treatment not required on items which are not exposed in the finish work or on those items where size prohibits such treatment.
2. Indicate on shop drawings where treatment is proposed to be omitted, if any.

3.10 TOUCH-UP AND PROTECTION

A. Touch-up: Immediately after erection, clean field welds, bolted connections and abraded areas of shop paint. Paint exposed areas with same material to same dry-film thickness as used for shop painting.

B. Protection: Protect the work from all damage or discoloration until acceptance of work.

3.11 CLEAN-UP

A. General: Keep all areas of work clean, neat and orderly at all times. Keep paved areas clean during installation. Clean up and remove all debris from the entire work prior to Final Acceptance to satisfaction of Owner.

END OF SECTION

D. REPORTS

- Geotechnical Report – October 14, 2024
- Structural Calculations – September 16,2024

Geotechnologies, Inc.
Consulting Geotechnical Engineers
439 Western Avenue
Glendale, California 91201-2837
818.240.9600 • Fax 818.240.9675

October 14, 2024
File Number 22539

Dunbar Architecture
12314 La Maida Street
Los Angeles, California 91607

Attention: Jen Dunbar

Subject: Geotechnical Engineering Investigation
Proposed Addition to Existing Structure
570 West Bonita Avenue
Claremont, California

Ladies and Gentlemen:

This letter transmits the Geotechnical Engineering Investigation for the subject site prepared by Geotechnologies, Inc. This report provides geotechnical recommendations for the development of the site, including earthwork, seismic design, retaining walls, excavations, shoring and foundation design. Engineering for the proposed project should not begin until approval of the geotechnical investigation is granted by the local building official. Significant changes in the geotechnical recommendations may result due to the building department review process.

The validity of the recommendations presented herein is dependent upon review of the geotechnical aspects of the project during construction by this firm. The subsurface conditions described herein have been projected from limited subsurface exploration and laboratory testing. The exploration and testing presented in this report should in no way be construed to reflect any variations which may occur between the exploration locations, or which may result from changes in subsurface conditions.

Should you have any questions please contact this office.

Respectfully submitted,
GEOTECHNOLOGIES, INC.

EDWARD F. HILL
G.E. 2126

EFH:kk

Email to: jen@dunbararchitecture.com

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GEOTECHNICAL ENGINEERING INVESTIGATION
PROPOSED ADDITION TO EXISTING STRUCTURE
570 WEST BONITA AVENUE
CLAREMONT, CALIFORNIA

INTRODUCTION

This report presents the results of the geotechnical engineering investigation performed on the subject property. The purpose of this investigation was to identify the distribution and engineering properties of the earth materials underlying the site, and to provide geotechnical recommendations for the design of the proposed development.

This investigation included three exploratory excavations, collection of representative samples, laboratory testing, engineering analysis, review of published geologic data, review of available geotechnical engineering information and the preparation of this report. The exploratory excavation locations are shown on the enclosed Plot Plan. The results of the exploration and the laboratory testing are presented in the Appendix of this report.

PROPOSED DEVELOPMENT

The proposed project consists of an addition to an existing building. The addition is proposed to be a single story, built at existing site grades. Column loads are estimated to be between 200 and 300 kips. Wall loads are estimated to be between 2 and 4 kips per lineal foot. Grading will consist of removal and recompaction of existing unsuitable soils.

Any changes in the design of the project or location of any structure, as outlined in this report, should be reviewed by this office. The recommendations contained in this report should not be considered valid until reviewed and modified or reaffirmed, in writing, subsequent to such review.

DOCUMENT REVIEW

Several documents were provided to this office for the purpose of preparing this investigation. A brief description of each document follows, starting with the oldest and moving forward in production date.

This office was provided plans for the existing site structure by Fred L. Ashton, Consulting Engineer, dated June of 1973. Sheet S1 shows that the existing structure is supported on conventional foundations which are between 1 and 1-1/2 feet in depth. A bearing pressure of 2,000psf was used in design based on notes found on Sheet S2. Sheet S2 also indicates that the foundation design was based on a "Preliminary Soils Investigation" by Hildenbrandt and Associates, dated August 23, 1973. The geotechnical report was not available at the time this report was prepared.

A report by Heider Engineering Services, Inc. dated June 10, 2014, was provided. This document is entitled "Geotechnical Investigation-Pavement Recommendations". This report is based on two shallow excavations and an R-Value determination.

Lastly, a geophysical report was provided prepared by SubSurface Surveys & Associates, Inc. The report is entitled "Geophysical Investigation Report", dated April 11, 2019. The report focused on areas of the site which were thought to be underlain by voids thereby causing distress to the overlying paving. Furthermore, a portion of the parking lot was thought to have been the former location of an underground storage tank(UST). These areas were explored using ground penetrating radar and electromagnetic induction. The report concluded that no significant voids were encountered however some of the limits of the excavation for the UST were thought to have been established.

SITE CONDITIONS

The property is located at the southwest corner of West Bonita Avenue and Cornell Avenue in the City of Claremont, California. The site is relatively level with approximately 8 feet of elevation change. Drainage across the site is by sheetflow to the southwest offsite to the improved City streets.

The site is currently developed with a single-story commercial structure. The vegetation on the site consists of well-tended shrubs and grasses. Locally small trees were observed on the site. The neighboring development consists of one to two-story residential structures on most nearby properties.

GEOTECHNICAL EXPLORATION

FIELD EXPLORATION

The site was explored on September 23, 2024, by excavating three exploratory excavations. The exploratory excavations varied in depth from 3 to 34 feet. The exploration was prosecuted with the aid of a truck-mounted drilling machine using 8-inch diameter hollowstem augers. The exploration locations are shown on the Plot Plan and the geologic materials encountered are logged on Plates A-1 through A-3.

The location of exploratory excavations was determined by information furnished by the client. Elevations of the exploratory excavations were determined by hand level or interpolation from data provided. The location and elevation of the exploratory excavations should be considered accurate only to the degree implied by the method used.

Geologic Materials

Fill earth materials were encountered in each of the geotechnical excavations. The fill was found to be between 3 and 7-1/2 feet in depth. The fill consists of silty sands and sands, which are dark brown, moist, medium dense, and fine to coarse grained. Cobbles were observed in the fill materials. Native earth materials underlying the fill were found to consist of sands to locally silty sands. The native soils were found to be dark to yellowish brown, moist, very dense, fine to coarse grained and contain cobbles. The native soils were found to be increasingly dense and cobbly with depth and the drilling could not advance past 34 feet.

Boring 1 was drilled within Cornell Avenue. Asphalt pavement was observed to be 3 inches thick. Base materials were found to underlie the asphalt. The thickness of base was found to be 4 inches.

The geologic materials consist of detrital sediments deposited by river and stream action typical to this area of Claremont. More detailed descriptions of the earth materials encountered may be obtained from individual logs of the subsurface excavations.

Groundwater

Groundwater was not encountered during exploration to the maximum explored depth of 34 feet. The historic high groundwater level was established by review of California Geological Survey Seismic Hazard Evaluation Report 040 Plate 1.2 entitled “Historically Highest Ground Water Contours”. Review of this plate indicates that the historically highest groundwater level is on the order of 75 feet below grade.

Fluctuations in the level of groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time of the measurements reported herein. Fluctuations also may occur across the site. High groundwater levels can result in changed conditions.

Caving

Caving could not be directly observed during exploration due to the type of excavation equipment utilized. Based on the experience of this firm, large diameter excavations, excavations that encounter granular, cohesionless soils and excavations below the groundwater table will most likely experience caving.

SEISMIC EVALUATION

REGIONAL GEOLOGIC SETTING

The subject property is located in the northern portion of the Peninsular Ranges Geomorphic Province. The Peninsular Ranges are characterized by northwest-trending blocks of mountain ridges and sediment-floored valleys. The dominant geologic structural features are northwest trending fault zones that either die out to the northwest or terminate at east-trending reverse faults that form the southern margin of the Transverse Ranges.

The site is underlain by unconsolidated alluvial sediments deposited by river and stream action, that are deeper than 200 feet.

REGIONAL FAULTING

Based on criteria established by the California Division of Mines and Geology (CDMG) now called California Geologic Survey (CGS), Faults may be categorized as Holocene-active, Pre-Holocene faults, and Age-undetermined faults. Holocene-active faults are those which show evidence of surface displacement within the last 11,700 years. Pre-Holocene faults are those that have not moved in the past 11,700 years. Age-undetermined faults are faults where the recency of fault movement has not been determined.

Buried thrust faults are faults without a surface expression but are a significant source of seismic activity. They are typically broadly defined based on the analysis of seismic wave recordings of hundreds of small and large earthquakes in the southern California area. Due to the buried nature of these thrust faults, their existence is usually not known until they produce an earthquake. The risk for surface rupture potential of these buried thrust faults is inferred to be low (Leighton, 1990). However, the seismic risk of these buried structures in terms of recurrence and maximum potential magnitude is not well established. Therefore, the potential for surface rupture on these surface-verging splays at magnitudes higher than 6.0 cannot be precluded.

SEISMIC HAZARDS AND DESIGN CONSIDERATIONS

The primary geologic hazard at the site is moderate to strong ground motion (acceleration) caused by an earthquake on any of the local or regional faults. The potential for other earthquake-induced hazards was also evaluated including surface rupture, liquefaction, dynamic settlement, inundation and landsliding.

Surface Rupture

In 1972, the Alquist-Priolo Special Studies Zones Act (now known as the Alquist-Priolo Earthquake Fault Zoning Act) was passed into law. As revised in 2018, The Act defines "Holocene-active" Faults utilizing the same aging criteria as that used by California Geological Survey (CGS). However, established state policy has been to zone only those faults which have direct evidence of movement within the last 11,700 years. It is this recency of fault movement that the CGS considers as a characteristic for faults that have a relatively high potential for ground rupture in the future.

CGS policy is to delineate a boundary from 200 to 500 feet wide on each side of the Holocene-Active fault trace based on the location precision, the complexity, or the regional significance of the fault. If a site lies within an Earthquake Fault Zone, a geologic fault rupture investigation must

be performed that demonstrates that the proposed building site is not threatened by surface displacement from the fault before development permits may be issued.

Ground rupture is defined as surface displacement which occurs along the surface trace of the causative fault during an earthquake. Based on research of available literature and results of site reconnaissance, no known Holocene-active or Pre-Holocene faults underlie the subject site. In addition, the subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Based on these considerations, the potential for surface ground rupture at the subject site is considered low.

Liquefaction

Liquefaction is a phenomenon in which saturated silty to cohesionless soils below the groundwater table are subject to a temporary loss of strength due to the buildup of excess pore pressure during cyclic loading conditions such as those induced by an earthquake. Liquefaction-related effects include loss of bearing strength, amplified ground oscillations, lateral spreading, and flow failures.

The Seismic Hazards Maps of the State of California (CDMG, 2016), does not classify the site as part of the potentially "Liquefiable" area. This determination is based on groundwater depth records, soil type and distance to a fault capable of producing a substantial earthquake.

Based on the dense nature of the underlying soils, and the depth to historic highest groundwater level, the potential for liquefaction occurring at the site is considered to be remote.

Dynamic Dry Settlement

Seismically-induced settlement or compaction of dry or moist, cohesionless soils can be an effect related to earthquake ground motion. Such settlements are typically most damaging when the settlements are differential in nature across the length of structures.

Some seismically-induced settlement of the proposed structures should be expected as a result of strong ground-shaking, however, due to the uniform nature of the underlying geologic materials, excessive differential settlements are not expected to occur.

Tsunamis, Seiches and Flooding

Tsunamis are large ocean waves generated by sudden water displacement caused by a submarine earthquake, landslide, or volcanic eruption. The site is located too far from the ocean to be affected by tsunami.

Seiches are oscillations generated in enclosed bodies of water which can be caused by ground shaking associated with an earthquake. Review of the City of Claremont Local Hazard Mitigation Plan, dated March 7, 2022, indicates the site lies within mapped inundation boundaries due to a seiche or a breached upgradient reservoir. A determination of whether a higher site elevation would remove the site from the potential inundation zones is beyond the scope of this investigation.

Landsliding

The probability of seismically-induced landslides occurring on the site is considered to be low due to the general lack of elevation difference across or adjacent to the site.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the exploration, laboratory testing, and research, it is the finding of Geotechnologies, Inc. that construction of the proposed building addition is considered feasible from a geotechnical engineering standpoint provided the advice and recommendations presented herein are followed and implemented during construction.

The existing fill materials are not suitable for support of the proposed foundations, floor slabs or additional fill. Existing fill materials should be completely removed within the building area and recompacted for support of proposed concrete slabs-on-grade. As an alternative to the recommended recompaction the slabs may be designed to derive support from the deepened foundation. Conventional foundations penetrating the existing fill materials and bearing in competent native soils are recommended for foundation support.

SEISMIC DESIGN CONSIDERATIONS

California Building Code Seismic Parameters

Based on information derived from the subsurface investigation, the subject site is classified as Site Class D, which corresponds to a "Stiff Soil" Profile, according to Table 20.3-1 of ASCE 7-16. This information and the site coordinates were input into the OSHPD seismic utility program (https://www.seismicmaps.org/) in order to calculate ground motion parameters for the site.

CALIFORNIA BUILDING CODE SEISMIC PARAMETERS	
California Building Code	2022
ASCE Design Standard	7-16
Risk Category	II
Site Class	D
Mapped Spectral Acceleration at Short Periods (S_S)	1.707g
Site Coefficient (F_a)	1.0
Maximum Considered Earthquake Spectral Response for Short Periods (S_{MS})	1.707g
Five-Percent Damped Design Spectral Response Acceleration at Short Periods (S_{DS})	1.138g
Mapped Spectral Acceleration at One-Second Period (S_1)	0.638g
Site Coefficient (F_v)	1.7*
Maximum Considered Earthquake Spectral Response for One-Second Period (S_{M1})	1.085g*
Five-Percent Damped Design Spectral Response Acceleration for One-Second Period (S_{D1})	0.727g*

** These values are determined based on the tabulated values shown on ASCE 7-16, Table 11.4-2 for the Long-Period Site Coefficient, F_v. It should be noted that the exception to performing a site-specific hazard analysis for structures on Site Class D for values of S_1 greater than or equal to 0.2 presented by ASCE 7-16 may be followed, provided the conditions outlined in the ASCE 7-16 Section 11.4.8 (including Supplement 3 of the ASCE 7 Standards) are implemented in the structural design and analyses. This exception recommends that, where a site-specific ground motion hazard analysis is not required, the S_{M1} determined by eq. (11.4-2) is increased by 50% for all applications of S_{M1} in this standard. The resulting value of the parameter S_{D1} determined by Eq. (11.4-4) shall be used for all applications of S_{D1} in this standard. This would require that the S_{M1} and S_{D1} values provided in the above table are increased by 50%.*

FILL SOILS

The maximum depth of fill encountered on the site was 7-1/2 feet. This material and any fill generated during demolition should be removed and recompacted as controlled fill for concrete slab-on-grade support.

EXPANSIVE SOILS

The onsite geologic materials are in the very low expansion range. The Expansion Index was found to be 3 for bulk samples remolded to 90 percent of the laboratory maximum density. Additional reinforcing is recommended as noted in the "Foundation Design" and "Slabs On Grade" sections of this report.

WATER-SOLUBLE SULFATES

The Portland cement portion of concrete is subject to attack when exposed to water-soluble sulfates. Usually, the two most common sources of exposure are from soil and marine environments.

The sources of natural sulfate minerals in soils include the sulfates of calcium, magnesium, sodium, and potassium. When these minerals interact and dissolve in subsurface water, a sulfate concentration is created, which will react with exposed concrete. Over time sulfate attack will destroy improperly proportioned concrete well before the end of its intended service life.

The water-soluble sulfate content of the onsite geologic materials was tested by California Test 417. The water-soluble sulfate content was determined to be less than 0.1% percentage by weight for the soils tested. Based on the most recent revision to American Concrete Institute (ACI) Standard 318, the sulfate exposure is considered to be negligible for geologic materials with less than 0.1% and Type I cement may be utilized for concrete foundations in contact with the site soils.

GRADING GUIDELINES

Site Preparation

- A thorough search should be made for possible underground utilities and/or structures. Any existing or abandoned utilities or structures located within the footprint of the proposed grading should be removed or relocated as appropriate.

- All vegetation, existing fill, and soft or disturbed geologic materials should be removed from the areas to receive controlled fill. All existing fill materials and any disturbed geologic materials resulting from grading operations shall be completely removed and properly recompacted prior to foundation excavation.

- Any vegetation or associated root system located within the footprint of the proposed structures should be removed during grading.

- Subsequent to the indicated removals, the exposed grade shall be scarified to a depth of six inches, moistened to optimum moisture content, and recompacted in excess of the minimum required comparative density.

- The excavated areas shall be observed by the geotechnical engineer prior to placing compacted fill.

Compaction

Comparative compaction is defined, for purposes of these guidelines, as the ratio of the in-place density to the maximum density as determined by applicable ASTM testing.

All fill should be mechanically compacted in layers not more than 8 inches thick. The materials placed should be moisture conditions to within 3 percent of the optimum moisture content of the particular material placed. All fills shall be compacted to at least 90 percent of the maximum laboratory density for the materials used. The maximum density shall be determined by the laboratory operated by Geotechnologies, Inc. in general accordance with the most recent revision of ASTM D 1557.

Field observation and testing shall be performed by a representative of the geotechnical engineer during grading to assist the contractor in obtaining the required degree of compaction and the proper moisture content. Where compaction is less than required, additional compactive effort shall be made with adjustment of the moisture content, as necessary, until a minimum of 90 percent compaction is obtained.

Acceptable Materials

The excavated onsite materials are considered satisfactory for reuse in the controlled fills as long as any debris and/or organic matter is removed.

Any imported materials shall be observed and tested by the representative of the geotechnical engineer prior to use in fill areas. Imported materials should contain sufficient fines so as to be relatively impermeable and result in a stable subgrade when compacted. Any required import materials should consist of geologic materials with an expansion index of less than 20. The water-soluble sulfate content of the import materials should be less than 0.1% percentage by weight.

Imported materials should be free from chemical or organic substances which could affect the proposed development. A competent professional should be retained in order to test imported materials and address environmental issues and organic substances which might affect the proposed development.

Utility Trench Backfill

Utility trenches should be backfilled with controlled fill. The utility should be bedded with clean sands at least one foot over the crown. The remainder of the backfill may be onsite soil compacted to 90 percent of the laboratory maximum density. Utility trench backfill should be tested by representatives of this firm in general accordance with the most recent revision of ASTM D 1557.

Wet Soils

At the time of exploration, the soils which will be exposed during grading were locally above optimum moisture content. It is anticipated that the excavated material to be placed as compacted fill, and the materials exposed at the bottom of excavated plane may require significant drying and aeration prior to recompaction.

Pumping (yielding or vertical deflection) of the high-moisture content soils at the bottom of the excavation may occur during operation of heavy equipment. Where pumping is encountered, angular minimum ¾-inch gravel and/or crushed concrete should be placed and worked into the subgrade. The exact thickness of the gravel would be a trial and error procedure and would be determined in the field. It would likely be on the order of 1 to 2 feet thick.

The gravel will help to densify the subgrade as well as function as a stabilization material upon which heavy equipment may operate. It is not recommended that rubber tire construction equipment attempt to operate directly on the pumping subgrade soils prior to placing the gravel. Direct operation of rubber tire equipment on the soft subgrade soils will likely result in excessive disturbance to the soils, which in turn will result in a delay to the construction schedule since those disturbed soils would then have to be removed and properly recompacted. Extreme care should be utilized to place gravel as the subgrade becomes exposed.

Shrinkage

Shrinkage results when a volume of soil removed at one density is compacted to a higher density. A shrinkage factor between 5 and 15 percent should be anticipated when excavating and recompacting the existing fill and underlying native geologic materials on the site to an average comparative compaction of 92 percent.

Weather Related Grading Considerations

When rain is forecast all fill that has been spread and awaits compaction shall be properly compacted prior to stopping work for the day or prior to stopping due to inclement weather. These fills, once compacted, shall have the surface sloped to drain to an area where water can be removed.

Temporary drainage devices should be installed to collect and transfer excess water to the street in non-erosive drainage devices. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope.

Work may start again, after a period of rainfall, once the site has been reviewed by a representative of this office. Any soils saturated by the rain shall be removed and aerated so that the moisture content will fall within three percent of the optimum moisture content.

Surface materials previously compacted before the rain shall be scarified, brought to the proper moisture content and recompacted prior to placing additional fill, if considered necessary by a representative of this firm.

Abandoned Seepage Pits

No abandoned seepage pits were encountered during exploration and none are known to exist on the site. However, should such a structure be encountered during grading, options to permanently abandon seepage pits include complete removal and backfill of the excavation with compacted fill, or drilling out the loose materials and backfilling to within a few feet of grade with slurry, followed by a compacted fill cap.

If the subsurface structures are to be removed by grading, the entire structure should be demolished. The resulting void may be refilled with compacted soil. Concrete and brick generated during the seepage pit removal may be reused in the fill as long as all fragments are less than 6 inches in longest dimension and the debris comprises less than 15 percent of the fill by volume. All grading should comply with the recommendations of this report.

Where the seepage pit structure is to be left in place, the seepage pits should be cleaned of all soil and debris. This may be accomplished by drilling. The pits should be filled with minimum 1-½ sack concrete slurry to within 5 feet of the bottom of the proposed foundations. In order to provide a more uniform foundation condition, the remainder of the void should be filled with controlled fill.

Geotechnical Observations and Testing During Grading

Geotechnical observations and testing during grading are considered to be a continuation of the geotechnical investigation. It is critical that the geotechnical aspects of the project be reviewed by representatives of Geotechnologies, Inc. during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise this office at least twenty-four hours prior to any required site visit.

Proper compaction is necessary to reduce settlement of overlying improvements. Some settlement of compacted fill should be anticipated. Any utilities supported therein should be designed to accept differential settlement. Differential settlement should also be considered at the points of entry to the structure.

LEED Considerations

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System encourages adoption of sustainable green building and development practices. Credit for LEED Certification can be assigned for reuse of construction waste and diversion of materials from landfills in new construction.

In an effort to provide the design team with a viable option in this regard, demolition debris could be crushed onsite in order to use it in the ongoing grading operations. The environmental ramifications of this option, if any, should be considered by the team.

The demolition debris should be limited to concrete, asphalt and other non-deleterious materials. All deleterious materials should be removed including, but not limited to, paper, garbage, ceramic materials and wood.

For structural fill applications, the materials should be crushed to ¾-inch in maximum dimension or smaller. The crushed materials should be thoroughly blended and mixed with onsite soils prior to placement as compacted fill. The amount of crushed material should not exceed 20 percent. The blended and mixed materials should be tested by this office prior to placement to ensure it is suitable for compaction purposes. The blended and mixed materials should be tested by Geotechnologies, Inc. during placement to ensure that it has been compacted in a suitable manner.

FOUNDATION DESIGN

Conventional

Conventional foundations may bear in competent native soils. All conventional foundations for a structure should bear in the same material.

Continuous foundations may be designed for a bearing capacity of 2,500 pounds per square foot, and should be a minimum of 12 inches in width, 36 inches in depth below the lowest adjacent grade and 12 inches into the recommended bearing material.

The bearing capacity increase for each additional foot of width is 200 pounds per square foot. The bearing capacity increase for each additional foot of depth is 400 pounds per square foot. The maximum recommended bearing capacity is 5,000 pounds per square foot.

The bearing capacities indicated above are for the total of dead and frequently applied live loads, and may be increased by one third for short duration loading, which includes the effects of wind or seismic forces.

Controlled Low Strength Material

Where the recommended overexcavation cannot be prosecuted such as adjacent to existing buildings or property lines, foundations will require deepening to bear in competent native soils. The deepened portion of the foundation excavations may be filled with controlled low-strength material (CLSM). This is allowable under 2016 California Building Code section 1804.7.

The foundation excavations should be cleaned of all loose materials prior to placement of the CLSM. The CLSM should consist of 3-sack slurry mix. A sample of the CLSM should be collected and checked for compressive strength. The results of the tests should indicate that the CLSM at 28 days yields a minimum of 100 pounds per square inch. This value translates to over 14,000 pounds per square foot.

The foundation may be formed and poured on top of the cured CLSM. Some method of ensuring a good bond between the top of the CLSM and the concrete of the proposed foundation should be employed.

Foundation Reinforcement

All continuous foundations should be reinforced with a minimum of four #4 steel bars. Two should be placed near the top of the foundation, and two should be placed near the bottom.

Lateral Design

Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure. An allowable coefficient of friction of 0.4 may be used with the dead load forces.

Passive geologic pressure for the sides of foundations poured against undisturbed or recompacted soil may be computed as an equivalent fluid having a density of 300 pounds per cubic foot with a maximum earth pressure of 3,000 pounds per square foot.

The passive and friction components may be combined for lateral resistance without reduction. A one-third increase in the passive value may be used for short duration loading such as wind or seismic forces.

Foundation Settlement

Settlement of the foundation system is expected to occur on initial application of loading. The maximum settlement is expected to be 3/4 inch and occur below the heaviest loaded columns. Differential settlement is not expected to exceed 1/4 inch.

Modulus of Subgrade Reaction

A unit modulus of subgrade reaction of 300 pounds per cubic inch (518 kcf) may be utilized for design of foundations. This value is a unit value for use with a one-foot square footing. The modulus should be reduced in accordance with the following equation when used with the larger footings:

$$K = K_1*[(B+1)/(2*B)]^2$$

Where:
K = Reduced Subgrade Modulus
K_1 = Unit Subgrade Modulus
B = Foundation Width (feet)

Foundation Observations

It is critical that all foundation excavations are observed by a representative of this firm to verify penetration into the recommended bearing materials. The observation should be performed prior to the placement of reinforcement. Foundations should be deepened to extend into satisfactory geologic materials, if necessary.

Foundation excavations should be cleaned of all loose soils prior to placing steel and concrete. Any required foundation backfill should be mechanically compacted, flooding is not permitted.

RETAINING WALL DESIGN

Cantilever Retaining Walls

Retaining walls supporting a level backslope may be designed utilizing a triangular distribution of pressure. Cantilever retaining walls may be designed for 30 pounds per cubic foot for walls retaining up to 6 feet of earth.

For this equivalent fluid pressure to be valid, walls which are to be restrained at the top should be backfilled prior to the upper connection being made. Additional active pressure should be added for a surcharge condition due to sloping ground, vehicular traffic or adjacent structures.

Retaining Wall Drainage

Subdrains may consist of 4-inch diameter perforated pipes, places with perforated facing down. The pipe shall be encased in at least one foot of gravel around the pipe. The gravel shall be wrapped in filter fabric. The gravel may consist of three-quarter inch to one-inch crushed rock. As an alternative, the use of gravel pockets and weepholes is an acceptable drainage method. Weepholes shall be a minimum of 2 inches in diameter, placed at 8 feet on center along the base of the wall. Gravel pockets shall be a minimum of 1 cubic foot in dimension and may consist of three-quarter inch to one inch crushed rock, wrapped in filter fabric. The rock pockets should be no more than 8 feet on center. A collector is placed within the gravel which directs collected waters through the wall to a sump or standard pipe and gravel system constructed under the slab. This method should be approved by the retaining wall designer prior to implementation.

Certain types of subdrain pipe are not acceptable to the various municipal agencies, it is recommended that prior to purchasing subdrainage pipe, the type and brand is cleared with the proper municipal agencies. Subdrainage pipes should outlet to an acceptable location.

Where retaining walls are to be constructed adjacent to property lines there is usually not enough space for emplacement of a standard pipe and gravel drainage system. Under these circumstances, the use of a flat drainage product is acceptable. Some municipalities do not allow the use of flat-drainage products. The use of such a product should be researched with the building official.

Dynamic (Seismic) Earth Pressure

The maximum dynamic active pressure is equal to the sum of the initial static pressure and the dynamic (seismic) pressure increment. Under the most recent building code, as interpreted by most building departments, seismic earth pressure is required in the design of restraining walls which support over 6 feet of earth. The proposed walls are less than 6 feet in height therefore the dynamic earth pressure may be omitted.

Waterproofing

Moisture affecting retaining walls is one of the most common post construction complaints. Poorly applied or omitted waterproofing can lead to efflorescence or standing water inside the building. Efflorescence is a process in which a powdery substance is produced on the surface of the concrete by the evaporation of water. The white powder usually consists of soluble salts such as gypsum, calcite, or common salt. Efflorescence is common to retaining walls and does not affect their strength or integrity.

Waterproofing is recommended for retaining walls. Waterproofing design and inspection of its installation is not the responsibility of the geotechnical engineer. A qualified waterproofing consultant should be retained in order to recommend a product or method which would provide protection to below grade walls.

Retaining Wall Backfill

Any required backfill should be mechanically compacted in layers not more than 8 inches thick, to at least 90 percent of the maximum density in general accordance with the most recent revision of ASTM D 1557 method of compaction. Flooding should not be permitted. Compaction within 5 feet, measured horizontally, behind a retaining structure should be achieved by use of light weight, hand operated compaction equipment.

Proper compaction of the backfill will be necessary to reduce settlement of overlying walks and paving. Some settlement of required backfill should be anticipated, and any utilities supported therein should be designed to accept differential settlement, particularly at the points of entry to the structure.

TEMPORARY EXCAVATIONS

Excavations on the order of 5 to 8-1/2 feet in vertical height will be required for the recommended deepened foundations. The excavations are expected to expose fill and dense native soils, which are suitable for vertical excavations up to 5 feet where not surcharged by adjacent traffic or structures. Excavations which will be surcharged by adjacent traffic or structures should be shored.

Where sufficient space is available, temporary unsurcharged embankments could be cut at a uniform 1:1 slope gradient. A uniform sloped excavation is sloped from bottom to top and does not have a vertical component.

Where sloped embankments are utilized, the tops of the slopes should be barricaded to prevent vehicles and storage loads near the top of slope within a horizontal distance equal to the depth of the excavation. If the temporary construction embankments are to be maintained during the rainy season, berms are strongly recommended along the tops of the slopes to prevent runoff water from entering the excavation and eroding the slope faces. Water should not be allowed to pond on top of the excavation nor to flow towards it.

Excavation Observations

It is critical that the soils exposed in the cut slopes are observed by a representative of Geotechnologies, Inc. during excavation so that modifications of the slopes can be made if variations in the geologic material conditions occur. Many building officials require that temporary

excavations should be made during the continuous observations of the geotechnical engineer. All excavations should be stabilized within 30 days of initial excavation.

Slot Cutting for Foundation Excavations

The slot cutting method employs the earth as a buttress and allows the earth excavation to proceed in phases. The initial excavation is made at a uniform 1:1 slope. Alternate "A" slots of 8 feet may be worked. The remaining earth buttresses ("B" slots) should be 8 feet in width. The foundation should be poured in the "A" slots before the "B" slots are excavated.

Trench Shoring

A temporary shoring system may also be utilized to provide a stable excavation for vertical excavations. The temporary shoring system may consist of a hydraulic trench shoring system. Temporary shoring and bracing system should be designed for a triangular pressure distribution with a minimum equivalent fluid pressure of 25 pounds per cubic foot, for excavations up to a vertical height of 10 feet.

The additional surcharge pressure from any adjacent foundation shall be added to the shoring design. The previous “Retaining Wall Section” provided recommendations to determine the surcharge loads on temporary shoring from existing foundations located within the 1:1 (h:v) surcharge influence zone of the shored excavation.

The owner and contractor must be aware that the use of trench or box shoring may impede the continuous construction of the proposed foundations. The sewer line may need to be placed in several phases to accommodate for the removal and/or movement of the trench shoring, while maintaining a stable excavation.

SLABS ON GRADE

The area of the addition is underlain by up to 7-1/2 feet of unsuitable fill materials. The fill should be removed and recompacted for concrete slab-on-grade support. As an alternative, slabs could be supported on the new foundation.

Concrete floor slabs should be a minimum of 4 inches in thickness. Slabs-on-grade should be cast over undisturbed natural geologic materials or properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent of the maximum dry density.

Outdoor concrete flatwork should be a minimum of 4 inches in thickness. Outdoor concrete flatwork should be cast over undisturbed natural geologic materials or properly controlled fill materials. Any geologic materials loosened or over-excavated should be wasted from the site or properly compacted to 90 percent of the maximum dry density.

Design of Slabs That Receive Moisture-Sensitive Floor Coverings

Geotechnologies, Inc. does not practice in the field of moisture vapor transmission evaluation and mitigation. Therefore, where necessary, it is recommended that a qualified consultant should be engaged to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. The qualified consultant should provide recommendations for mitigation of potential adverse impacts of moisture vapor on various components of the structure.

Where any dampness would be objectionable or where the slab will be cast below the historic high groundwater level, it is recommended that floor slabs should be waterproofed. A qualified waterproofing consultant should be engaged in order to recommend a product and/or method which would provide protection from unwanted moisture.

Based on ACI 302.2R-30, Chapter 7, for projects which do not have vapor sensitive coverings or humidity-controlled areas, a vapor retarder/barrier is not necessary. Where a vapor retarder/barrier is considered necessary, the design of the slab and the installation of the vapor retarder/barrier should comply with the most recent revisions of ASTM E 1643 and ASTM E 1745. The vapor retarder/barrier should comply with ASTM E 1745 Class A requirements. The necessity of a vapor retarder/barrier is not a geotechnical issue and should be confirmed by qualified members of the design team.

Based on ACI 302.2R-30, Chapter 7, for projects with vapor sensitive coverings, a vapor retarder/ barrier should be provided. Figure 7.1 shows that the slab should be poured on the vapor retarder/barrier. The ACI guide notes in 5.2.3.2 that the decision to locate the vapor retarder/barrier in direct contact with the slab's underside had long been debated. Experience has shown, however, that the greatest level of protection for floor coverings, coating, or building environments is provided when the vapor retarder/barrier is placed in direct contact with the slab. The necessity of a vapor retarder as well as the use of dry granular material, as discussed above is not a geotechnical issue and should be confirmed by qualified members of the design team.

Where a vapor retarder/barrier is used, it should be placed on a level and compact subgrade. Precautions should be taken to protect the vapor retarder/barrier from damage during installation of reinforcing, utilities and concrete. The use of stakes driven thought the vapor retarder/barrier should be avoided. Repair any damaged areas of the vapor retarder/barrier prior to concrete placement.

Groundwater was not encountered on the subject site to a depth of 34 feet. Proposed concrete slabs-on-grade do not need to be supported on a layer of compacted aggregate to provide a capillary break.

Concrete Crack Control

The recommendations presented in this report are intended to reduce the potential for cracking of concrete slabs-on-grade due to settlement. However, even where these recommendations have been implemented, foundations, stucco walls and concrete slabs-on-grade may display some cracking due to minor soil movement and/or concrete shrinkage. The occurrence of concrete cracking may be reduced and/or controlled by limiting the slump of the concrete used, proper concrete placement and curing, and by placement of crack control joints at reasonable intervals, in particular, where re-entrant slab corners occur.

For standard control of concrete cracking, a maximum crack control joint spacing of 15 feet should not be exceeded. Lesser spacings would provide greater crack control. Joints at curves and angle points are recommended. The crack control joints should be installed as soon as practical following concrete placement. Crack control joints should extend a minimum depth of one-fourth the slab thickness. Construction joints should be designed by a structural engineer.

Complete removal of the existing fill soils beneath outdoor flatwork such as walkways or patio areas, is not required, however, due to the rigid nature of concrete, some cracking, a shorter design life and increased maintenance costs should be anticipated. In order to provide uniform support beneath the flatwork it is recommended that a minimum of 12 inches of the exposed subgrade beneath the flatwork be scarified and recompacted to 90 percent relative compaction.

Slab Reinforcing

Concrete slabs-on-grade should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

Outdoor flatwork should be reinforced with a minimum of #3 steel bars on 24-inch centers each way.

PAVEMENTS

Prior to placing paving, the existing grade should be scarified to a depth of 12 inches, moistened as required to obtain optimum moisture content, and recompacted to 90 percent of the maximum density as determined by the most recent revision of ASTM D 1557. The design team should be aware that removal of all existing fill in the area of new paving is not required, however, pavement constructed in this manner will most likely have a shorter design life and increased maintenance costs. The following pavement sections are recommended:

Service	Asphalt Pavement Thickness (inches)	Base Course (inches)
Passenger Cars (TI=4)	3	4
Moderate Truck (TI=6)	4	6

Aggregate base should be compacted to a minimum of 95 percent of the most recent revision of ASTM D 1557 laboratory maximum dry density. Base materials should consist of Crushed Aggregate Base which conform with Section 200-2.2 of the most recent edition of "Standard Specifications for Public Works Construction", (Green Book).

The performance of pavement is highly dependent upon providing positive surface drainage away from the edges. Ponding of water on or adjacent to pavement can result in saturation of the subgrade materials and subsequent pavement distress. If planter islands are planned, the perimeter curb should extend a minimum of 12 inches below the bottom of the aggregate base. In addition, where landscaping is planned adjacent to pavement, it is recommended that a cutoff wall should be provided along the edge of the pavement. The cutoff wall should extend at least 12 inches below the depth of the base course.

The management of pavement wear primarily is focused on the distress caused by vertical loads. The reduction of vertical loading from large vehicles is assisted by increasing the number of axles.

Multi-axle groups reduce the peak vertical loading and, when closely spaced, reduce the magnitude of the strain cycles to which the pavement is subjected. However, where tight low-speed turns are executed, non-steering axle groups lead to transverse shear forces (scuffing) at the pavement-tire interface.

With asphaltic concrete pavements, tensile shear stresses from tires can cause surface cracking and raveling, thus, the increased use of non-steering axle groups results in increased pavement wear in the vicinity of intersections and turnarounds where tight low speed turns are executed.

When designing intersections and turnarounds the turn radius should be as large as possible. This will lead to reduced "scuffing" forces. Where tight radius turns are unavoidable, the pavement surface design should take into account the high level of "scuffing" forces that will occur and thickened pavement and subgrade and base course keyways should be considered to assist in the reduction of lateral deflection.

SITE DRAINAGE

Proper surface drainage is critical to the future performance of the project. Saturation of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. Proper site drainage should be maintained at all times.

All site drainage, with the exception of any required to be disposed of onsite by stormwater regulations, should be collected and transferred to the street in non-erosive drainage devices. The proposed structure should be provided with roof drainage. Discharge from downspouts, roof drains and scuppers should not be permitted on unprotected soils within five feet of the building perimeter. Drainage should not be allowed to pond anywhere on the site, and especially not against any foundation or retaining wall. Drainage should not be allowed to flow uncontrolled over any descending slope. Planters which are located within a distance equal to the depth of a retaining wall should be sealed to prevent moisture adversely affecting the wall. Planters which are located

within five feet of a foundation should be sealed to prevent moisture affecting the earth materials supporting the foundation.

STORMWATER DISPOSAL

Introduction

Recently regulatory agencies have been requiring the disposal of a certain amount of stormwater generated on a site by infiltration into the site soils. Increasing the moisture content of a soil can cause it to lose internal shear strength and increase its compressibility, resulting in a change in the designed engineering properties. This means that any overlying structure, including buildings, pavements and concrete flatwork, could sustain damage due to saturation of the subgrade soils. Structures serviced by subterranean levels could be adversely impacted by stormwater disposal by increasing the design fluid pressures on retaining walls and causing leaks in the walls. Proper site drainage is critical to the performance of any structure in the built environment.

Percolation Testing

In order to establish a percolation rate for the site soils, one of the borings was used for a percolation test. The boring was drilled a depth of 34 feet below the existing site grade with the aid of a truck-mounted drilling machine, equipped with 8-inch diameter hollowstem augers. At the completion of drilling, a 2-inch diameter casing was placed within the center of the boreholes for the purpose of conducting percolation testing. The casing consisted of solid PVC pipes from the ground surface to a 5 feet, and perforated PVC pipes between depths of 5 and 15 feet. A sand pack consisting of #3 Monterey Sand was poured into the annular space around the perforated portion of the casing. A 1-foot thick hydrated bentonite seal was placed over the sand.

After the casing was installed, the borehole was filled with water for the purpose of pre-soaking for a minimum of 4 hours. After presoaking, the borehole was refilled with water, and the rate of

drop in the water level was measured. The percolation test readings were recorded a minimum of 8 times or until a stabilized rate of drop was obtained, whichever occurred first. The percolation testing was performed within the native alluvial soils.

Based on results of the percolation testing, a percolation rate of 220 inches per hour may be utilized for design of a dry well-type systems. No safety factors or reduction factors have been applied to this percolation rate. The civil engineer must apply the required factors of safety to the percolation rate provided herein.

The Proposed System

The location(s) for potential stormwater disposal have not been specifically addressed on this site. It is the opinion of this office that stormwater infiltration is possible on this site, however until the plan achieves more definition, and this office can address the impacts, stormwater infiltration is not recommended.

It is the opinion of this firm that any infiltration of stormwater in close proximity to structures should occur below the influence zone of the proposed foundations. Foundation influence zones would be expected to extend to depths correlating to roughly twice the width of the largest pad footing and approximately 4 times the width of wall footings.

Recommendations

The design and construction of stormwater infiltration facilities is not the responsibility of the geotechnical engineer. However, based on the experience of this firm, it is recommended that several aspects of the use of such facilities should be considered by the design and construction team:

- Open infiltration basins have many negative associated issues. Such a design must consider attractive nuisance, impacts to growing vegetation, impacts to air quality and vector control.

- All infiltration devices should be provided with overflow protection. Once the device is full of water, additional water flowing to the device should be diverted to another acceptable disposal area, or disposed offsite in an acceptable manner.

- All connections associated with stormwater infiltration devices should be sealed and water-tight. Water leaking into the subgrade soils can lead to loss of strength, piping, erosion, settlement and/or expansion of the affected earth materials.

- Excavations proposed for the installation of stormwater facilities should comply with the "Temporary Excavations" sections of this (the referenced) reports well as CalOSHA Regulations where applicable.

DESIGN REVIEW

Engineering of the proposed project should not begin until approval of the geotechnical report by the Building Official is obtained in writing. Significant changes in the geotechnical recommendations may result during the building department review process.

It is recommended that the geotechnical aspects of the project be reviewed by this firm during the design process. This review provides assistance to the design team by providing specific recommendations for particular cases, as well as review of the proposed construction to evaluate whether the intent of the recommendations presented herein are satisfied.

CONSTRUCTION MONITORING

Geotechnical observations and testing during construction are considered to be a continuation of the geotechnical investigation. It is critical that this firm review the geotechnical aspects of the project during the construction process. Compliance with the design concepts, specifications or recommendations during construction requires review by this firm during the course of construction. All foundations should be observed by a representative of this firm prior to placing

concrete or steel. Any fill which is placed should be observed, tested, and verified if used for engineered purposes. Please advise Geotechnologies, Inc. at least twenty-four hours prior to any required site visit.

If conditions encountered during construction appear to differ from those disclosed herein, notify Geotechnologies, Inc. immediately so the need for modifications may be considered in a timely manner.

It is the responsibility of the contractor to ensure that all excavations and trenches are properly sloped or shored. All temporary excavations should be cut and maintained in accordance with applicable OSHA rules and regulations.

EXCAVATION CHARACTERISTICS

The exploration performed for this investigation is limited to the geotechnical excavations described. Direct exploration of the entire site would not be economically feasible. The owner, design team and contractor must understand that differing excavation and drilling conditions may be encountered based on boulders, gravel, oversize materials, groundwater and many other conditions. Fill materials, especially when they were placed without benefit of modern grading codes, regularly contain materials which could impede efficient grading and drilling. Southern California sedimentary bedrock is known to contain variable layers which reflect differences in depositional environment. Such layers may include abundant gravel, cobbles and boulders. Similarly bedrock can contain concretions. Concretions are typically lenticular and follow the bedding. They are formed by mineral deposits. Concretions can be very hard. Excavation and drilling in these areas may require full size equipment and coring capability. The contractor should be familiar with the site and the geologic materials in the vicinity.

CLOSURE AND LIMITATIONS

The purpose of this report is to aid in the design and completion of the described project. Implementation of the advice presented in this report is intended to reduce certain risks associated with construction projects. The professional opinions and geotechnical advice contained in this report are sought because of special skill in engineering and geology and were prepared in accordance with generally accepted geotechnical engineering practice. Geotechnologies, Inc. has a duty to exercise the ordinary skill and competence of members of the engineering profession. Those who hire Geotechnologies, Inc. are not justified in expecting infallibility, but can expect reasonable professional care and competence.

The recommendations of this report pertain only to the site investigated and are based upon the assumption that the geologic conditions do not deviate from those disclosed in the investigation. If any variations are encountered during construction, or if the proposed construction will differ from that anticipated herein, Geotechnologies, Inc. should be notified so that supplemental recommendations can be prepared.

This report is issued with the understanding that it is the responsibility of the owner, or the owner's representatives, to ensure that the information and recommendations contained herein are brought to the attention of the project architect and engineer and are incorporated into the plans. The owner is also responsible to see that the contractor and subcontractors carry out the geotechnical recommendations during construction.

The findings of this report are valid as of the date of this report. However, changes in the conditions of a property can occur with the passage of time, whether they are due to natural processes or the works of man on this or adjacent properties. In addition, changes in applicable or appropriate standards may occur, whether they result from legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated wholly or partially by changes outside

control of this firm. Therefore, this report is subject to review and should not be relied upon after a period of three years.

Geotechnical observations and testing during construction is considered to be a continuation of the geotechnical investigation. It is, therefore, most prudent to employ the consultant performing the initial investigative work to provide observation and testing services during construction. This practice enables the project to flow smoothly from the planning stages through to completion.

Should another geotechnical firm be selected to provide the testing and observation services during construction, that firm should prepare a letter indicating their assumption of the responsibilities of geotechnical engineer of record. A copy of the letter should be provided to the regulatory agency for review. The letter should acknowledge the concurrence of the new geotechnical engineer with the recommendations presented in this report.

EXCLUSIONS

Geotechnologies, Inc. does not practice in the fields of methane gas, radon gas, environmental engineering, waterproofing, dewatering, organic substances or the presence of corrosive soils or wetlands which could affect the proposed development including mold and toxic mold. Nothing in this report is intended to address these issues and/or their potential effect on the proposed development. A competent professional consultant should be retained in order to address environmental issues, waterproofing, organic substances and wetlands which might affect the proposed development.

GEOTECHNICAL TESTING

Classification and Sampling

The soil is continuously logged by a representative of this firm and classified by visual examination in accordance with the Unified Soil Classification system. The field classification is verified in the

laboratory, also in accordance with the Unified Soil Classification System. Laboratory classification may include visual examination, Atterberg Limit Tests and grain size distribution. The final classification is shown on the excavation logs.

Samples of the geologic materials encountered in the exploratory excavations were collected and transported to the laboratory. Undisturbed samples of soil are obtained at frequent intervals. Unless noted on the excavation logs as an SPT sample, samples acquired while utilizing a hollow-stem auger drill rig are obtained by driving a thin-walled, California Modified Sampler with successive 30-inch drops of a 140-pound hammer. Samples from bucket-auger drilling are obtained utilizing a California Modified Sampler with successive 12-inch drops of a kelly bar, whose weight is noted on the excavation logs. The soil is retained in brass rings of 2.50 inches outside diameter and 1.00 inch in height. The central portion of the samples are stored in close fitting, waterproof containers for transportation to the laboratory. Samples noted on the excavation logs as SPT samples are obtained in general accordance with the most recent revision of ASTM D 1586. Samples are retained for 30 days after the date of the geotechnical report.

Grain Size Distribution

These tests cover the quantitative determination of the distribution of particle sizes in soils. Sieve analysis is used to determine the grain size distribution of the soil larger than the Number 200 sieve.

General accordance with the most recent revision of ASTM D 422 is used to determine particle sizes smaller than the Number 200 sieve. A hydrometer is used to determine the distribution of particle sizes by a sedimentation process.

The grain size distributions are plotted on the E-Plates presented in the Appendix of this report.

Moisture and Density Relationships

The field moisture content and dry unit weight are determined for each of the undisturbed soil samples, and the moisture content is determined for SPT samples in general accordance with the most recent revision of ASTM D 4959 or ASTM D 4643. This information is useful in providing a gross picture of the soil consistency between exploration locations and any local variations. The dry unit weight is determined in pounds per cubic foot and shown on the “Excavation Logs”, A-Plates. The field moisture content is determined as a percentage of the dry unit weight.

Direct Shear Testing

Shear tests are performed in general accordance with the most recent revision of ASTM D 3080 with a strain controlled, direct shear machine manufactured by Soil Test, Inc. or a Direct Shear Apparatus manufactured by GeoMatic, Inc. The rate of deformation is approximately 0.025 inches per minute. Each sample is sheared under varying confining pressures in order to determine the Mohr-Coulomb shear strength parameters of the cohesion intercept and the angle of internal friction. Samples are generally tested in an artificially saturated condition. Depending upon the sample location and future site conditions, samples may be tested at field moisture content. The results are plotted on the "Shear Test Diagram," B-Plates.

The most recent revision of ASTM 3080 limits the particle size to 10 percent of the diameter of the direct shear test specimen. The sheared sample is inspected by the laboratory technician running the test. The inspection is performed by splitting the sample along the sheared plane and observing the soils exposed on both sides. Where oversize particles are observed in the shear plane, the results are discarded and the test run again with a fresh sample.

Consolidation Testing

Settlement predictions of the soil's behavior under load are made on the basis of the consolidation tests in general accordance with the most recent revision of ASTM D 2435. The consolidation apparatus is designed to receive a single one-inch high ring. Loads are applied in several increments in a geometric progression, and the resulting deformations are recorded at selected time intervals. Porous stones are placed in contact with the top and bottom of each specimen to permit addition and release of pore fluid. Samples are generally tested at increased moisture content to determine the effects of water on the bearing soil. The normal pressure at which the water is added is noted on the drawing. Results are plotted on the "Consolidation Test," C-Plates.

Expansion Index Testing

The expansion tests performed on the remolded samples are in accordance with the Expansion Index testing procedures, as described in the most recent revision of ASTM D 4829. The soil sample is compacted into a metal ring at a saturation degree of 50 percent. The ring sample is then placed in a consolidometer, under a vertical confining pressure of 1 lbf/square inch and inundated with distilled water. The deformation of the specimen is recorded for a period of 24 hour or until the rate of deformation becomes less than 0.0002 inches/hour, whichever occurs first. The expansion index, EI, is determined by dividing the difference between final and initial height of the ring sample by the initial height, and multiplied by 1,000.

Laboratory Compaction Characteristics

The maximum dry unit weight and optimum moisture content of a soil are determined in general accordance with the most recent revision of ASTM D 1557. A soil at a selected moisture content is placed in five layers into a mold of given dimensions, with each layer compacted by 25 blows of a 10 pound hammer dropped from a distance of 18 inches subjecting the soil to a total compactive effort of about 56,000 pounds per cubic foot. The resulting dry unit weight is

determined. The procedure is repeated for a sufficient number of moisture contents to establish a relationship between the dry unit weight and the water content of the soil. The data when plotted represent a curvilinear relationship known as the compaction curve. The values of optimum moisture content and modified maximum dry unit weight are determined from the compaction curve.

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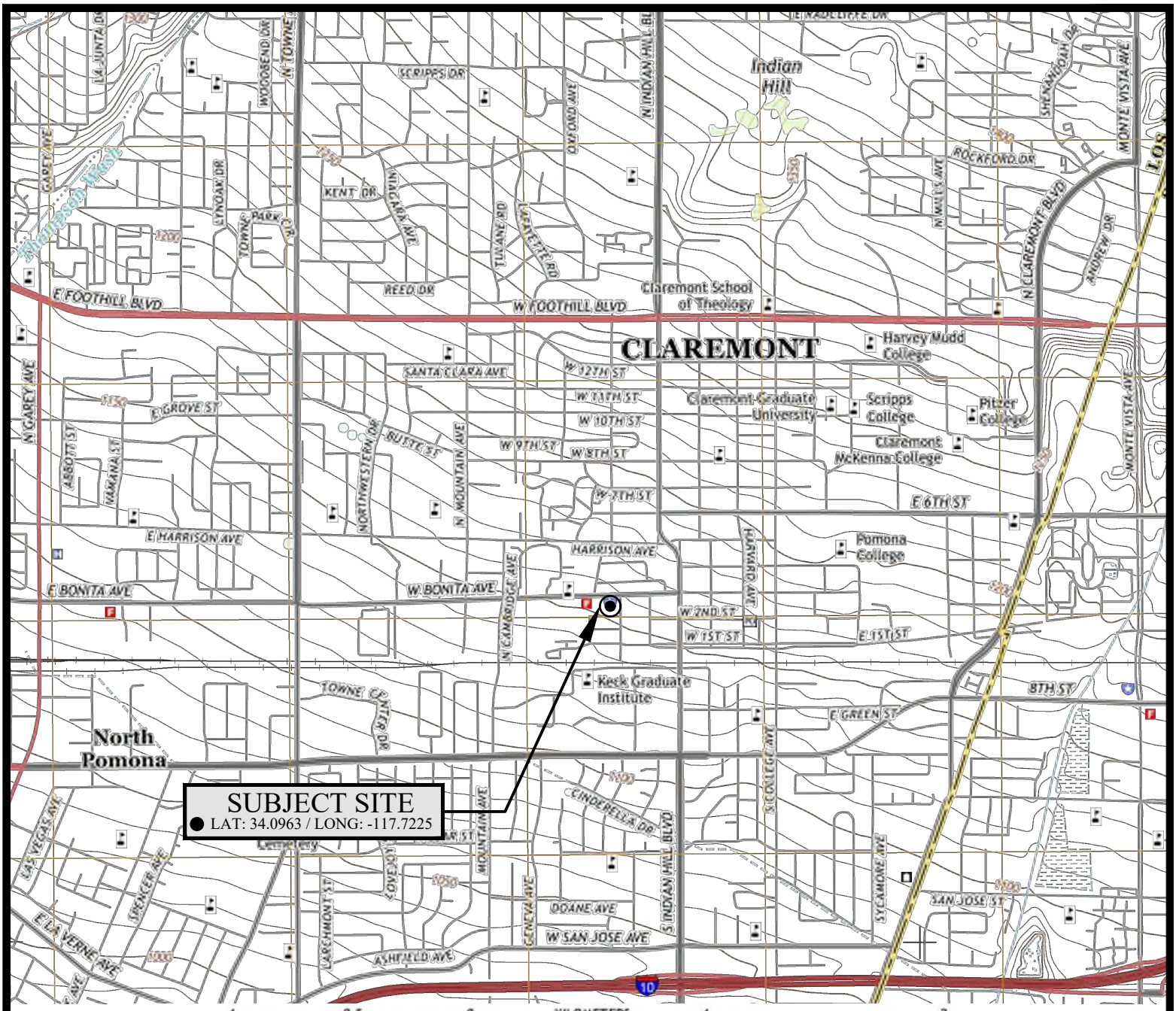


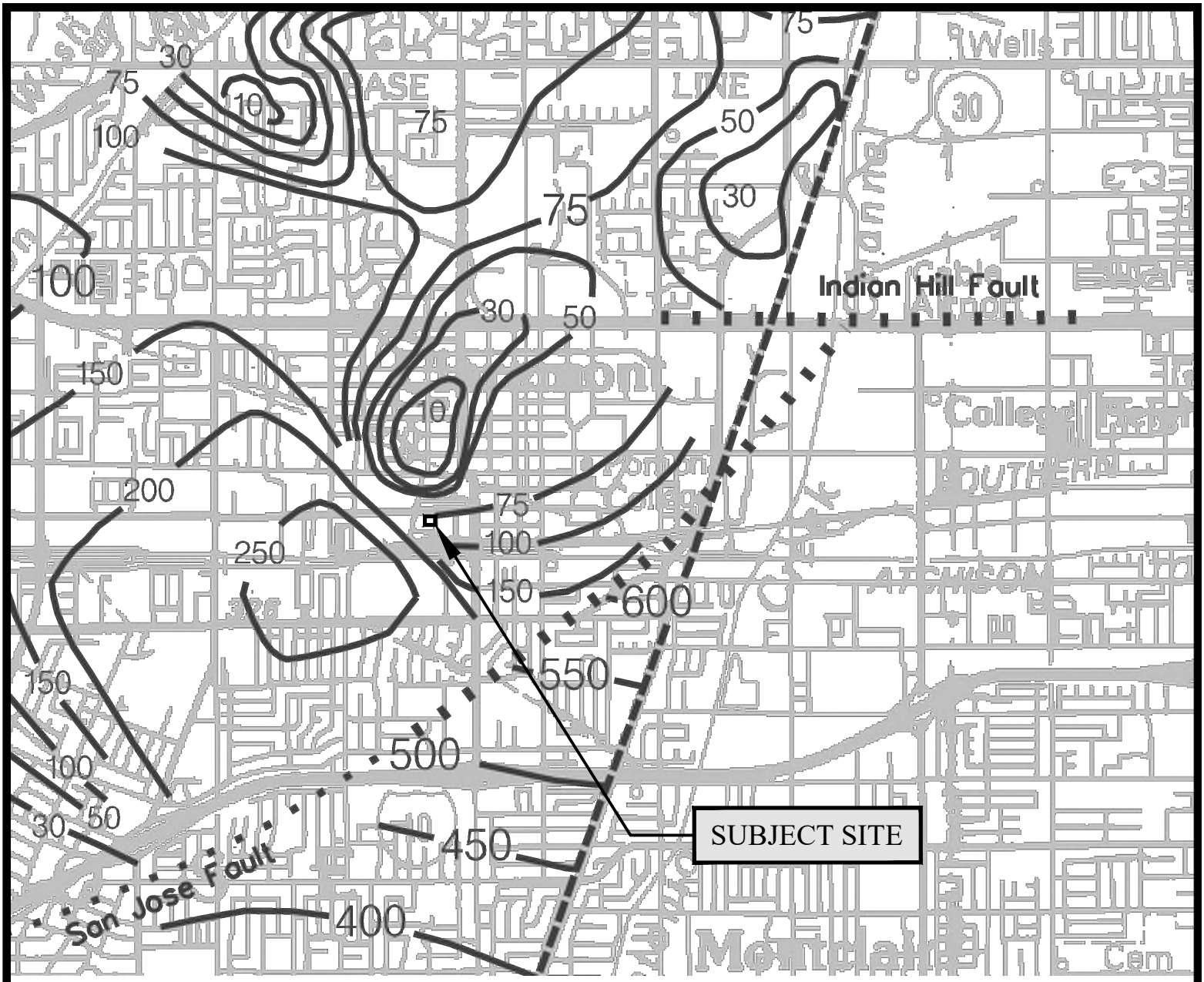
REFERENCE: U.S.G.S. TOPOGRAPHIC MAPS, 7.5 - MINUTE SERIES, ONTARIO, CA QUADRANGLE 2015

VICINITY MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CLAREMONT

FILE NO: 22539



LEGEND

- Borehole Site
- 30 — Depth to ground water in feet

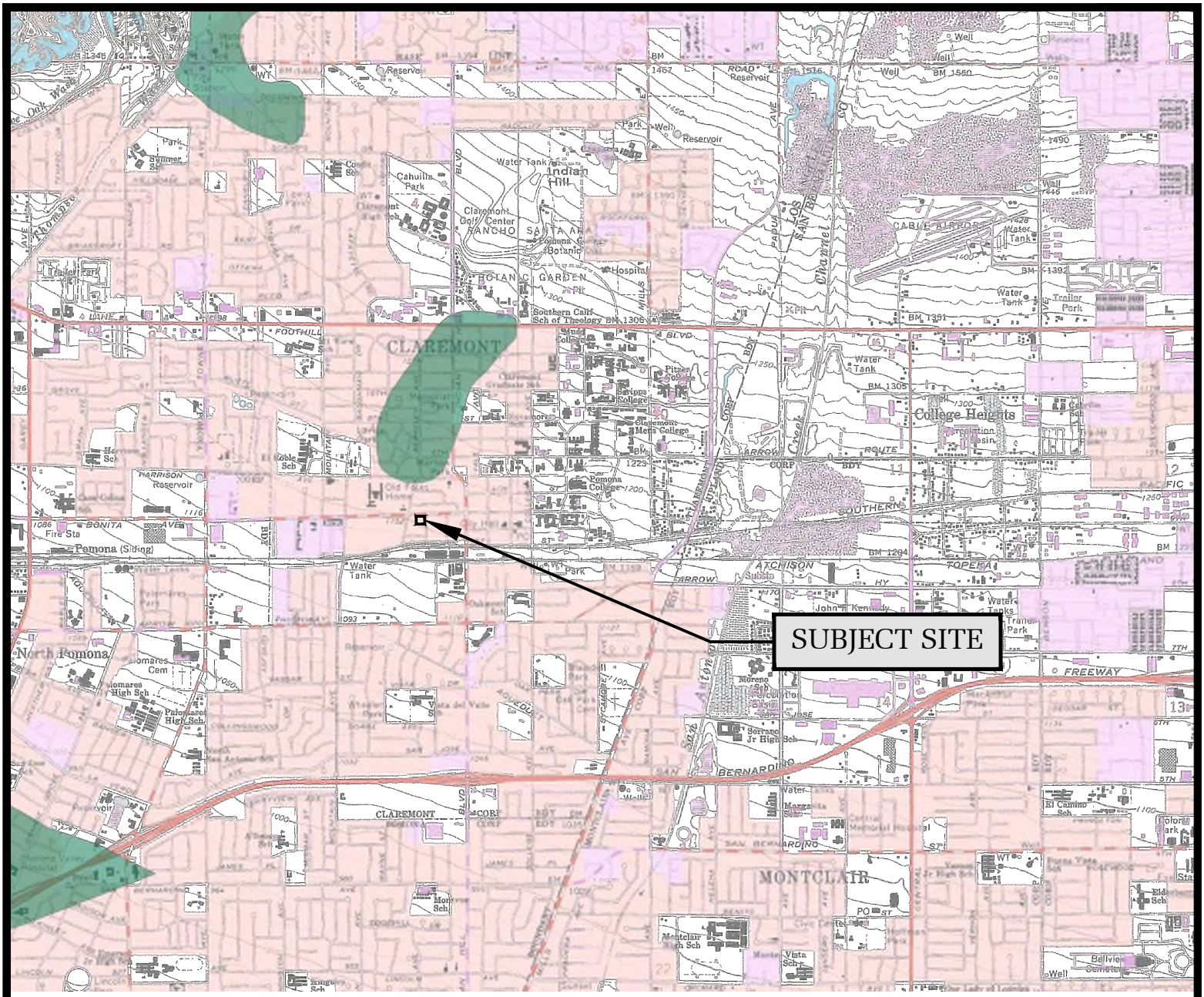
REFERENCE: SEISMIC HAZARD ZONE REPORT, 040 ONTARIO, 7.5 - MINUTE QUADRANGLE, LOS ANGELES COUNTY, CALIFORNIA 2000 (REV 2006)

HISTORICALLY HIGHEST GROUNDWATER LEVELS MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CLAREMONT

FILE NO: 22539



LEGEND

LIQUEFACTION ZONES

EARTHQUAKE-INDUCED LANDSLIDE ZONES

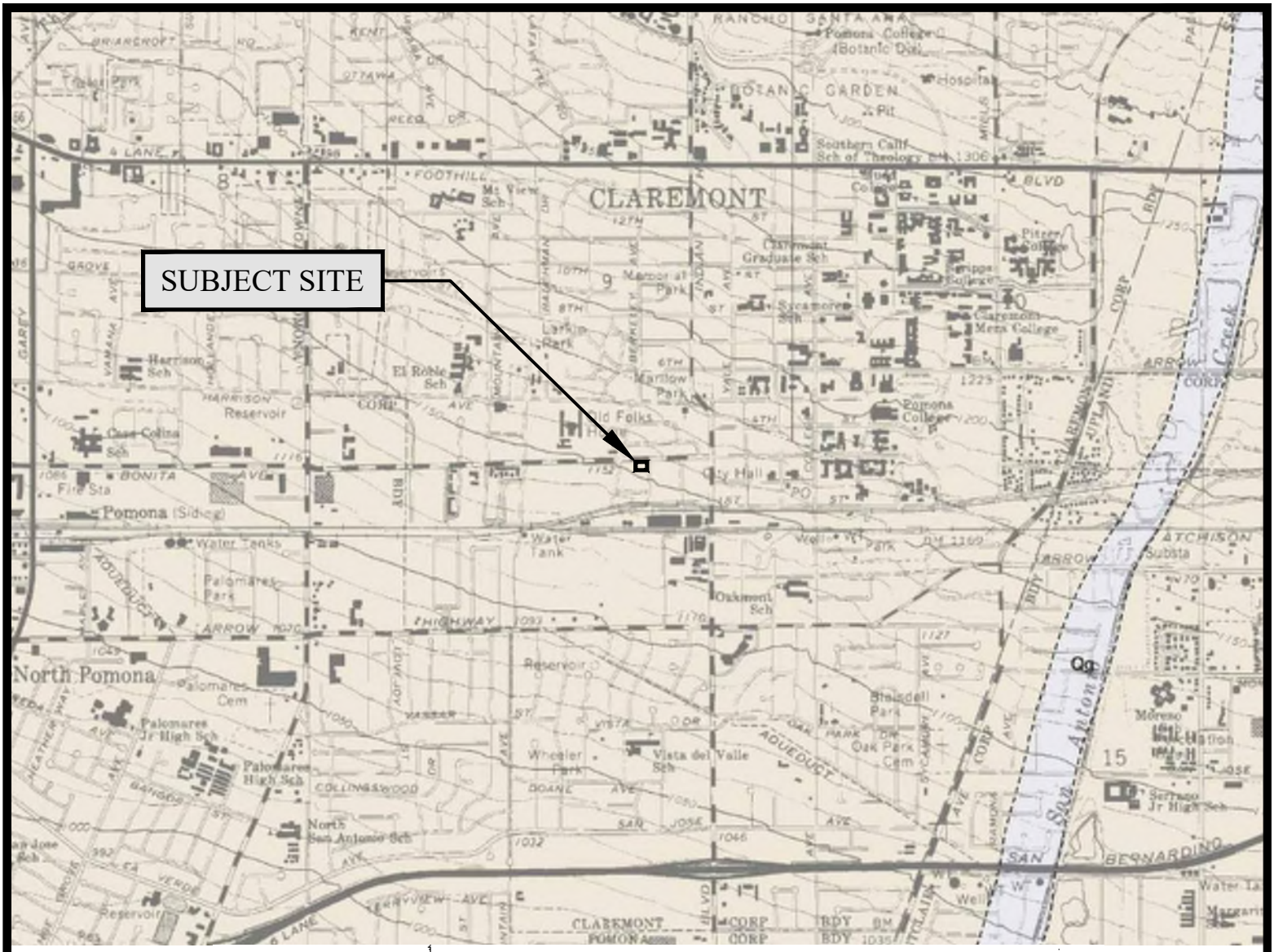
REFERENCE: EARTHQUAKE ZONES OF REQUIRED INVESTIGATION, ONTARIO QUADRANGLE (CGS, 2016)

EARTHQUAKE ZONES OF REQUIRED INVESTIGATION MAP

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CLAREMONT

FILE NO: 22539



LEGEND

Qg: Surficial Sediments - Alluvial gravel and sand of stream channels, some artificially channelized

Qa: Alluvial gravel and sand of valley areas

Folds - arrow on axial trace of fold indicates direction of plunge

Fault - dashed where indefinite or inferred, dotted where concealed, queried where existence is doubtful

REFERENCE: T.W. DIBBLEE (EDITED 2002) GEOLOGIC MAP OF THE SAN DIMAS AND ONTARIO QUADRANGLES (#DF-91)

GEOLOGIC MAP (DIBBLEE)

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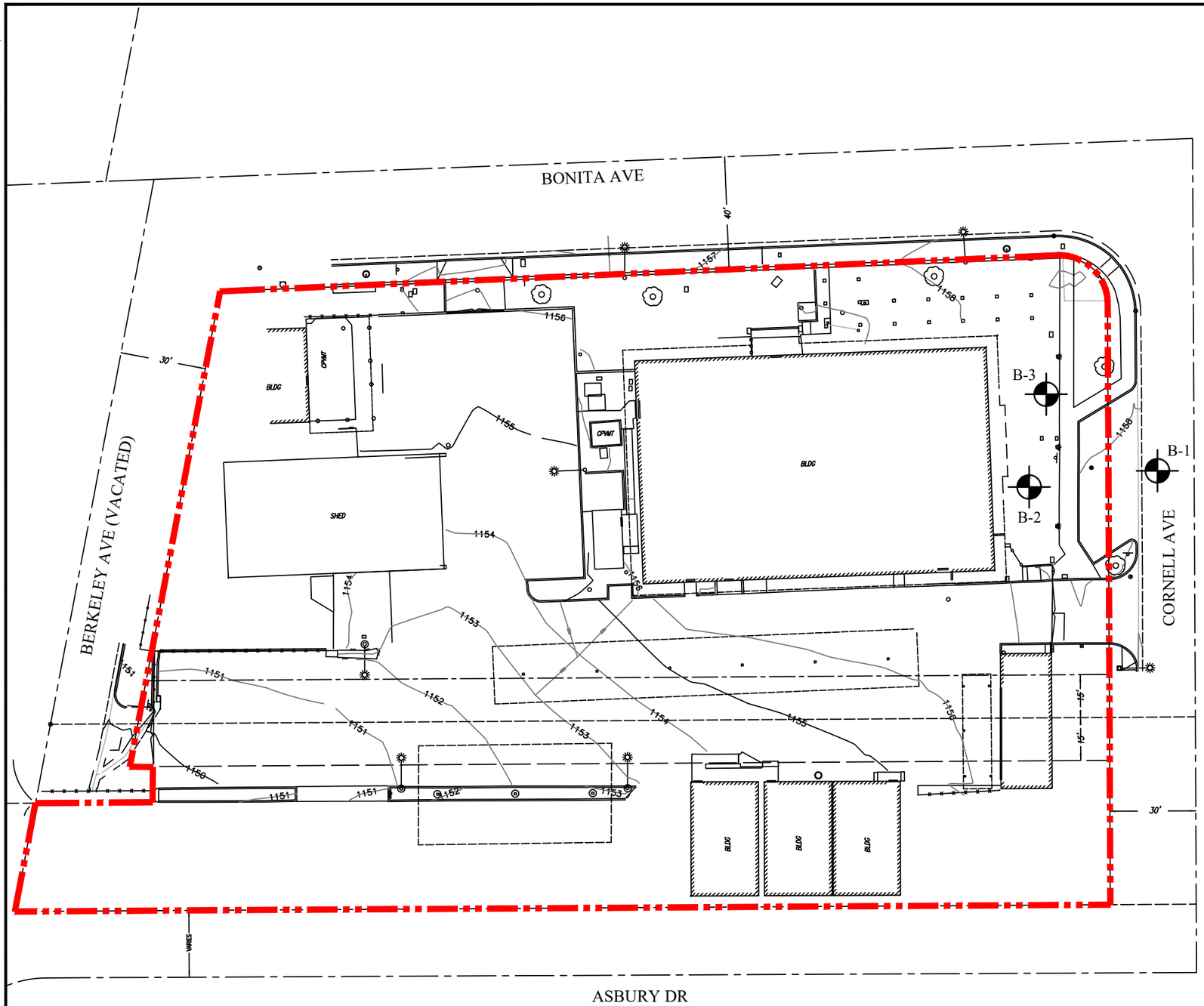
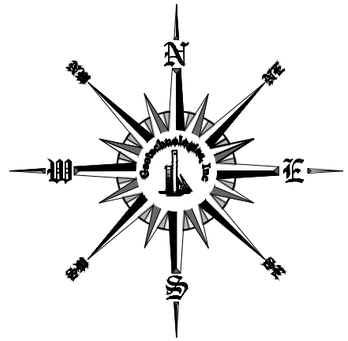
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CALREMONT

FILE NO: 22539





LEGEND

B-3 — LOCATION AND NUMBER OF BORING (THIS INVESTIGATION)

LIMITS OF PROJECT SITE

REFERENCE: DESIGN SURVEYS CLAREMONT POLICE DEPT BY CABRINHA, HEARN & ASSOCIATES DATED 01/09/2024

PLOT PLAN

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CLAREMONT

Drawn by: JD | File No.: 22539

Date: October 2024

BORING LOG NUMBER 1

Dunbar Architecture **Date: 09/23/24** **Elevation: 1158'**

File No. 22539 **Method: 8-inch diameter Hollow Stem Auger**

kk

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Asphalt for Street
				0 --		3" Asphalt, Over 4" Base
				-		
				1 --		FILL: Silty Sand to Sand, dark brown, moist, medium dense, fine to coarse grained, cobbles
				-		
				2 --		
				-		
				3 --		
				-		Total Depth 3 feet
				4 --		No Water
				-		Fill to 2 feet
				5 --		
				-		
				6 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				-		
				7 --		
				-		Used 8-inch diameter Hollow-Stem Auger
				8 --		140-lb. Automatic Hammer, 30-inch drop
				-		Modified California Sampler used unless otherwise noted
				9 --		
				-		
				10 --		
				-		
				11 --		
				-		
				12 --		
				-		
				13 --		
				-		
				14 --		
				-		
				15 --		
				-		
				16 --		
				-		
				17 --		
				-		
				18 --		
				-		
				19 --		
				-		
				20 --		
				-		
				21 --		
				-		
				22 --		
				-		
				23 --		
				-		
				24 --		
				-		
				25 --		
				-		

BORING LOG NUMBER 2

Dunbar Architecture **Date: 09/23/24** **Elevation: 1158'**

File No. 22539 **Method: 8-inch diameter Hollow Stem Auger**

kk

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
				0 --		FILL: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				1 --		
				2 --		
2.5	100/8"	5.3	108.1	-		
				3 --		Silty Sand, dark brown, moist, medium dense, fine grained, minor cobbles
				4 --		
5	100/9"	2.9	123.6	5 --		
				6 --	SM/SP	Silty Sand to Sand, dark and yellow brown, moist, very dense, fine to medium grained, minor cobbles
				7 --		
7.5	45	2.7	128.0	-		
	50/4"			8 --	SW	Sand, dark and yellowish brown, moist, very dense, fine to coarse grained, cobbles
				9 --		
10	95	2.3	131.6	10 --		
				11 --		
				12 --		
				13 --		
				14 --		
15	100/7"	4.0	125.7	15 --		
				16 --		
				17 --		
				18 --		
				19 --		
20	100/8"	3.0	123.3	20 --		
				21 --		Total Depth 20 feet No Water Fill to 5 feet
				22 --		
				23 --		NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual.
				24 --		Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop
				25 --		Modified California Sampler used unless otherwise noted

BORING LOG NUMBER 3

Dunbar Architecture **Date: 09/23/24** **Elevation:**

File No. 22539 **Method: 8-inch diameter Hollow Stem Auger**

kk

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description Surface Conditions: Planter Area
				0 --		FILL: Silty Sand to Sand, dark brown, moist, medium dense, fine grained
				-		
				1 --		
				-		
				2 --		
2.5	40	3.1	98.6	-		
	50/4"			3 --		Silty Sand to Sand, dark and yellowish brown, moist, very dense, fine grained, cobbles
				-		
				4 --		
				-		
5	24	4.2	SPT	5 --		
				-		
				6 --		
				-		
				7 --		
7.5	90	2.4	123.5	-		
				8 --	SP/SW	Sand, dark and yellowish brown, moist, very dense, fine to coarse grained, cobbles
				-		
				9 --		
				-		
10	54	2.5	SPT	10 --		
	50/5"			-	SW	Sand, dark and yellowish brown, moist, very dense, fine to coarse grained, cobbles
				11 --		
				-		
				12 --		
12.5	100/9"	Disturbed		-		
				13 --		
				-		
				14 --		
				-		
15	85	3.2	SPT	15 --		
				-		
				16 --		
				-		
				17 --		
17.5	100/8.5"	7.7	125.9	-		
				18 --		
				-		
				19 --		
				-		
20	79	3.5	SPT	20 --		
				-		
				21 --		
				-		
				22 --		
22.5	100/8"	4.3	97.0	-		
				23 --		
				-		
				24 --		
				-		
25	44	5.6	SPT	25 --		
				-	SP/SW	Sand, dark and yellowish brown, moist, medium, many cobbles dense to dense, fine to coarse grained

BORING LOG NUMBER 3

Dunbar Architecture

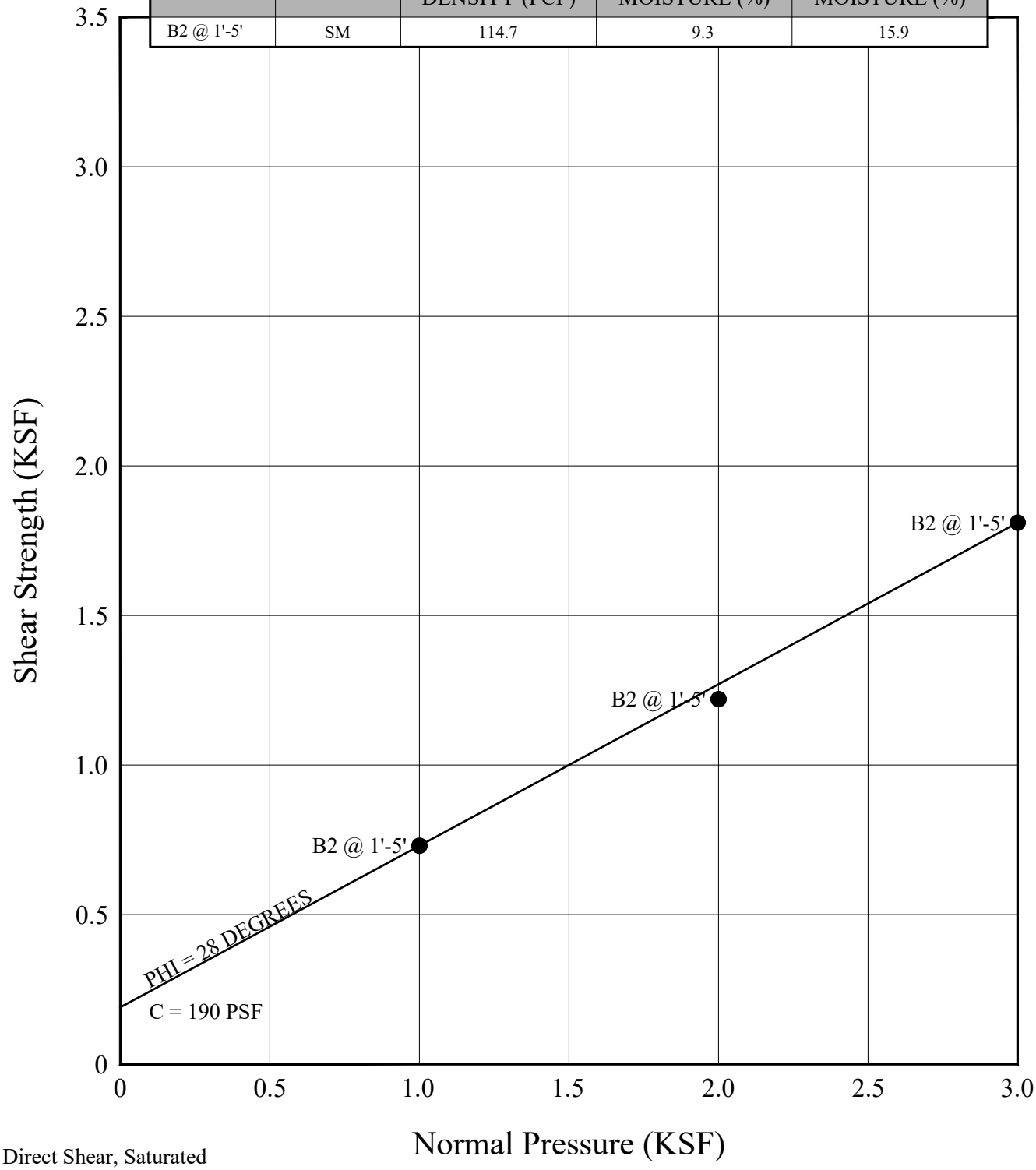
File No. 22539

kk

Sample Depth ft.	Blows per ft.	Moisture content %	Dry Density p.c.f.	Depth in feet	USCS Class.	Description
				- 26 -- - 27 -- -		
27.5	48 50/5"	5.0	119.0	- 28 -- - 29 -- -	SW	Sand, dark and yellowish brown, moist, very dense, fine to coarse grained, cobbles
30	35 50/4"	4.8	SPT	30 -- - 31 -- - 32 --	SP/SW	Sand, dark and yellowish brown, moist, very dense, fine to coarse grained, many cobbles, hard drilling
32.5	100/8"	4.4	115.6	- 33 -- - 34 -- - 35 -- - 36 -- - 37 -- - 38 -- - 39 -- - 40 -- - 41 -- - 42 -- - 43 -- - 44 -- - 45 -- - 46 -- - 47 -- - 48 -- - 49 -- - 50 -- -		Total Depth 34 feet by refusal No Water Fill to 7½ feet NOTE: The stratification lines represent the approximate boundary between earth types; the transition may be gradual. Used 8-inch diameter Hollow-Stem Auger 140-lb. Automatic Hammer, 30-inch drop Modified California Sampler used unless otherwise noted SPT=Standard Penetration Test

BULK SAMPLE REMOLDED TO 90 PERCENT OF THE MAXIMUM LABORATORY DENSITY

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B2 @ 1'-5'	SM	114.7	9.3	15.9



● Direct Shear, Saturated

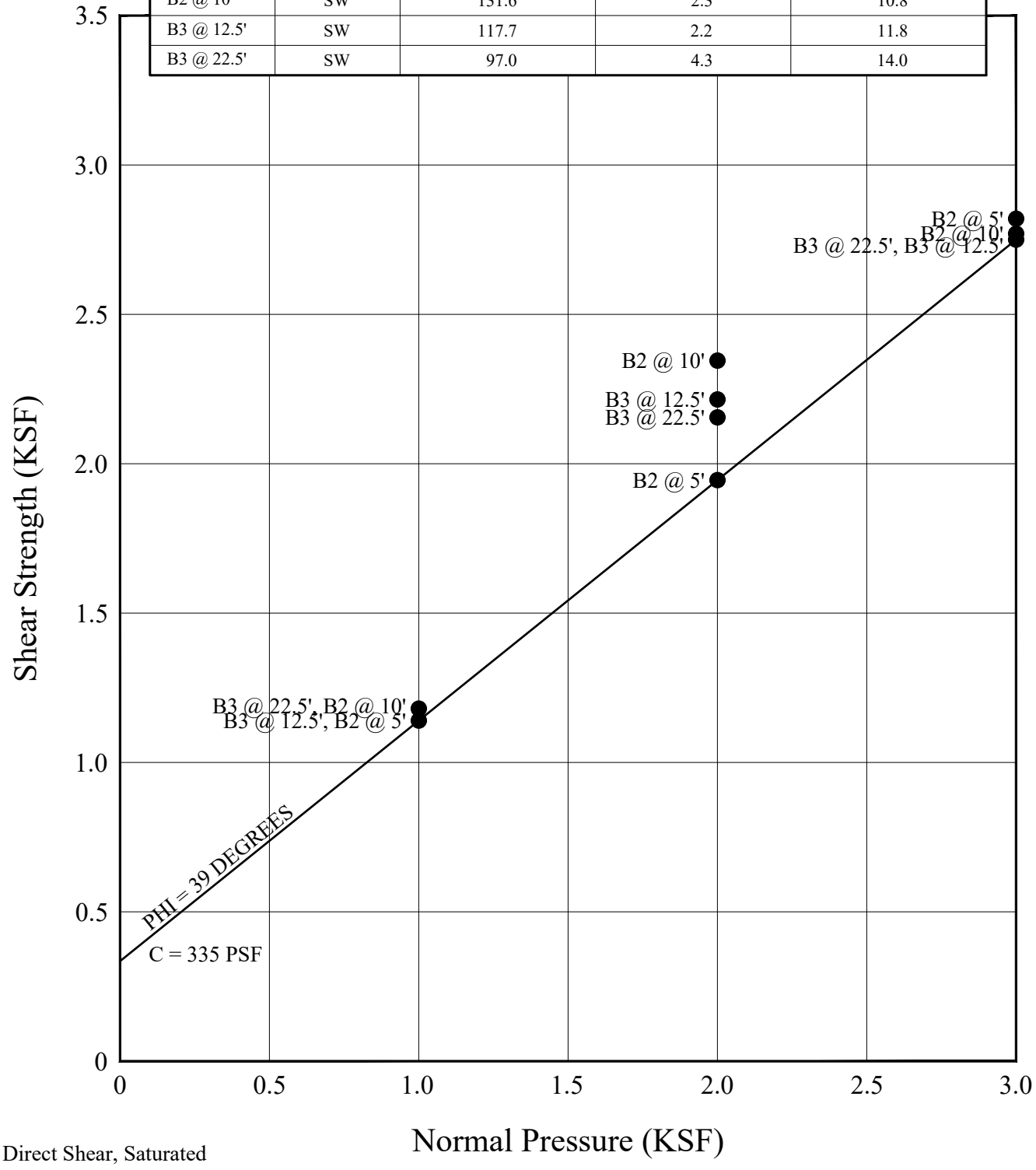
SHEAR TEST DIAGRAM (ASTM D3080)

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CALREMONT

FILE NO: 22539 | PLATE: B-1

SAMPLE	SOIL TYPE	DRY DENSITY (PCF)	INITIAL MOISTURE (%)	FINAL MOISTURE (%)
B2 @ 5'	SM/SP	123.6	2.9	18.0
B2 @ 10'	SW	131.6	2.3	10.8
B3 @ 12.5'	SW	117.7	2.2	11.8
B3 @ 22.5'	SW	97.0	4.3	14.0



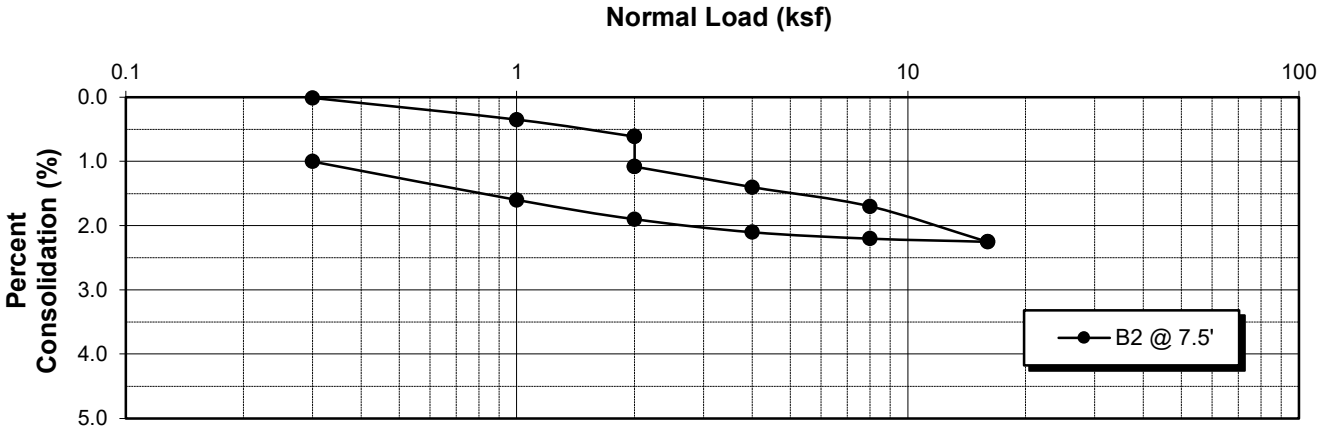
● Direct Shear, Saturated

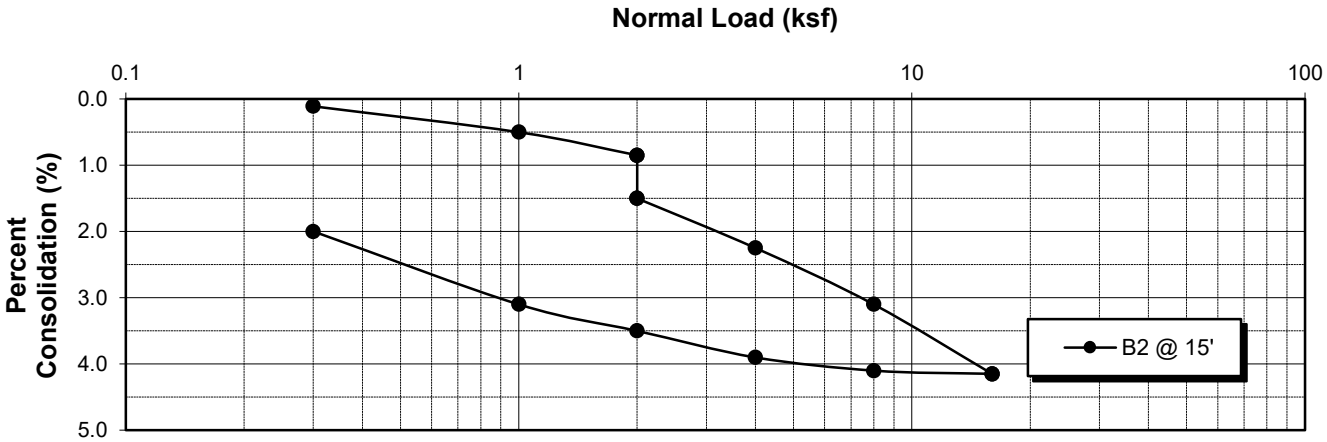
SHEAR TEST DIAGRAM (ASTM D3080)

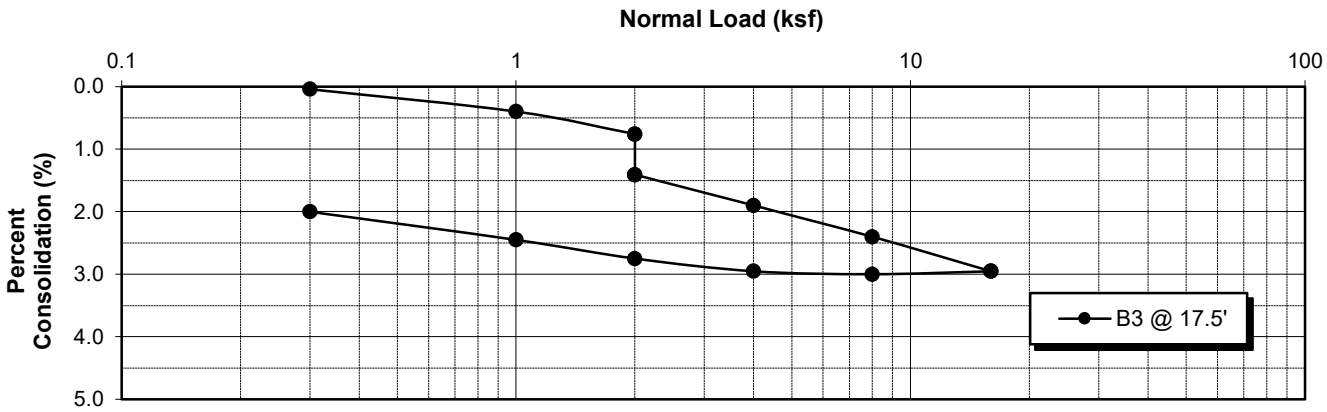
Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CALREMONT

FILE NO: 22539 | PLATE: B-2







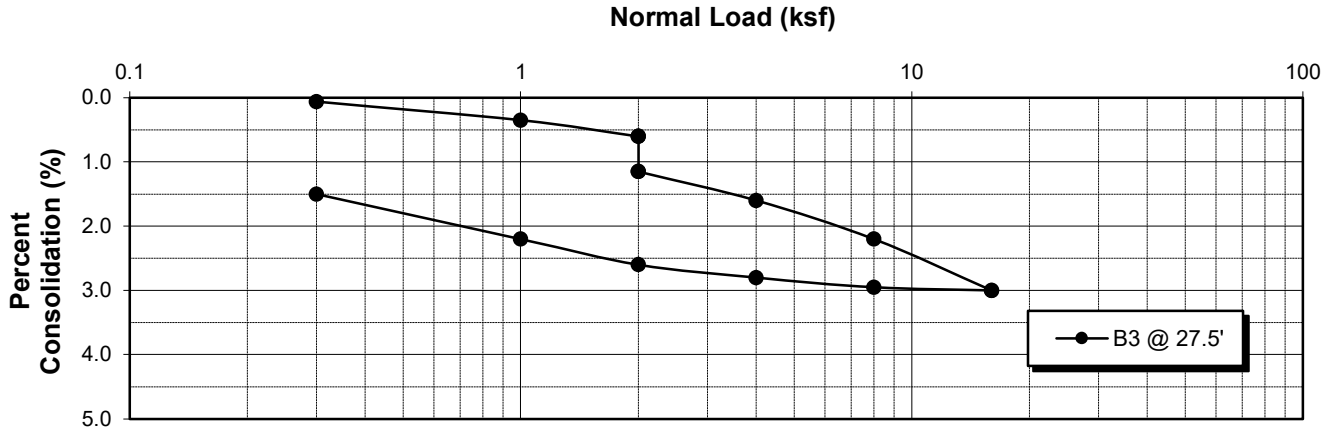
Water added at 2 KSF

CONSOLIDATION (ASTM D2435)

Geotechnologies, Inc.
Consulting Geotechnical Engineers

PROJECT: DUNBAR ARCHITECTURE

FILE NO.: 22539 | PLATE: C-1



Water added at 2 KSF

CONSOLIDATION(ASTM D2435)

Geotechnologies, Inc.
Consulting Geotechnical Engineers

PROJECT: DUNBAR ARCHITECTURE

FILE NO.: 22539 | PLATE: C-2

LABORATORY COMPACTION CHARACTERISTICS (ASTM D1557)	
SAMPLE	B2 @ 1'-5'
SOIL TYPE	SM
MAXIMUM DRY DENSITY (PCF)	127.4
OPTIMUM MOISTURE %	9.3

EXPANSION INDEX (ASTM D4829)	
SAMPLE	B2 @ 1'-5'
SOIL TYPE	SM
EXPANSION INDEX UBC STANDARD 18-2	3
EXPANSION CHARACTER	VERY LOW

SULFATE CONTENT (CALIFORNIA TEST 417)	
SAMPLE	B2 @ 1'-5'
SULFATE CONTENT: (Percentage by Weight)	<0.1%

COMPACTION/EXPANSION/SULFATE DATA SHEET

Geotechnologies, Inc.
Consulting Geotechnical Engineers

DUNBAR ARCHITECTURE
570 W BONITA AVE., CLAREMONT

FILE NO: 22539 | PLATE: D

September 28, 2024
Lab No. 4205-5
File No. 24-5766-5

Geotechnologies, Inc.
439 Western Avenue
Glendale, CA 91201

SUBJECT: R-Value Testing
Sample Delivered to Laboratory

Gentlemen:

Pursuant to your request, R-Value testing was performed on the soil samples delivered to our laboratory. R-Value testing was performed in accordance with California Test 301-F criteria. The test results follow:

R-VALUE RESULTS

PROJECT: Dunbar Architecture, #22539
LOCATION: B-1 @ 1 - 3'
Soil Description: Dark Brown Gravelly coarse to fine Sand

ITEM	1	2	3
Compaction Pressure – psi	250/350	250/350	250/350
Initial Moisture - %	5.8	5.8	5.8
Moisture at Compaction - %	6.2	6.7	5.8
Density – pcf	138.2	138.5	136.8
R-Value	82	81	85
Exudation Pressure	289	141	588
Expansion Pressure thickness ft.	0.00	0.00	0.00

Assigned R-Value: 82

Thank you for allowing *Pacific Materials Laboratory, Inc*. to be of service. If we may be of further service regarding this or other geotechnical issues, please do not hesitate to call at (805) 482-9801, or email at pmlgeo@gmail.com.

Respectfully Submitted,
PACIFIC MATERIALS LABORATORY, INC.

Douglas C. Papay, CE 29,565
President

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS C. PAPAY
CE 29565
Exp: 3/31/25
CIVIL
STATE OF CALIFORNIA

DCP:dkp
cc: Addressee (Email)

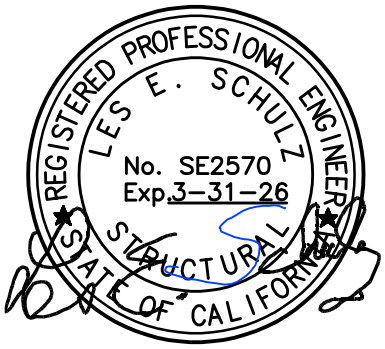
STRUCTURAL CALCULATIONS

for

Claremont PD Addition
570 W Bonita Ave
Claremont, CA 91711

for

Dunbar Architecture
12314 La Maida St
Valley Village, CA 91607



WHEELER & GRAY
1333 S. MAYFLOWER AVENUE, SUITE 320
MONROVIA, CA 91016

W&G #24215

Table of Contents

1. Justification of No Seismic Retrofit Required for Existing Building

Summary:

In this section, seismic weights from new addition are compared with the existing building on both X- and Y- directions, it is found that the seismic weight increases from new addition are significantly less than 10% of seismic weights of the existing building. According to existing building code CEBC, no seismic retrofit of the existing is required.

Total Seismic Wt of Existing Building

Total Seismic Wt of Existing Building on X-dir:

= Seismic Roof Wt + Seismic Wall Wt on X-dir

= 2271 kips + 274 kips (see the following pages)

= 2,545 kips

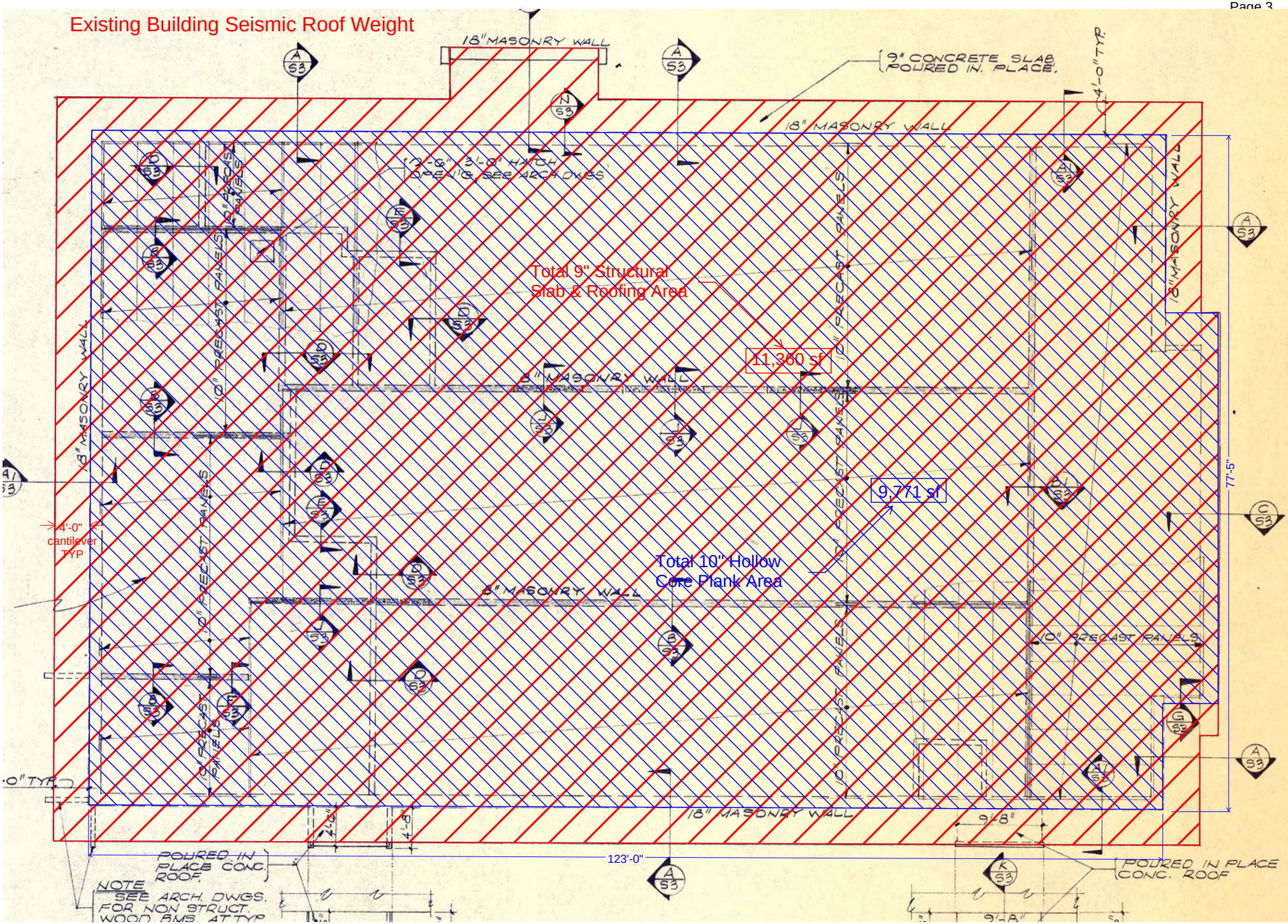
Total Seismic Wt of Existing Building on Y-dir:

= Seismic Roof Wt + Seismic Wall Wt on Y-dir

= 2271 kips + 386 kips (see the following pages)

= 2,657 kips

Existing Building Seismic Roof Weight



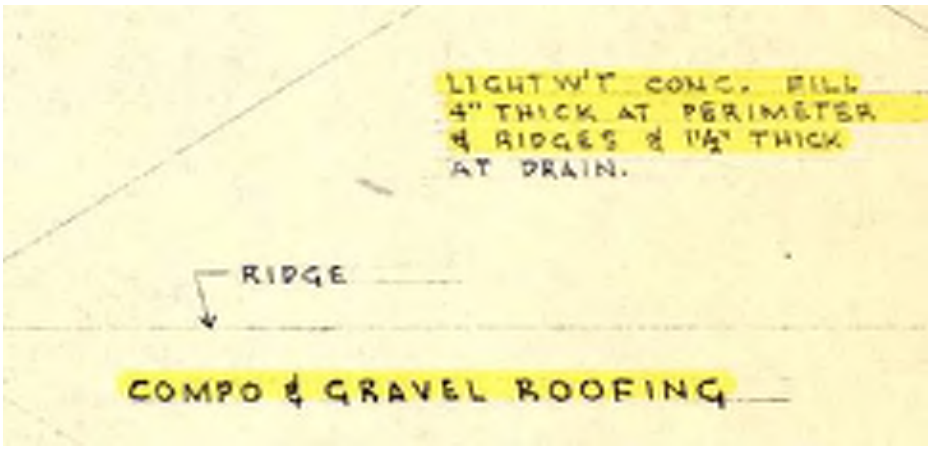
Existing Building Seismic Roof Weight = 10" hollow core plan weight + 9" conc slab w/ LW topping slab & roofing
= 65 psf x 9771 sf + 144 psf x 11, 360 sf = 2271 kips

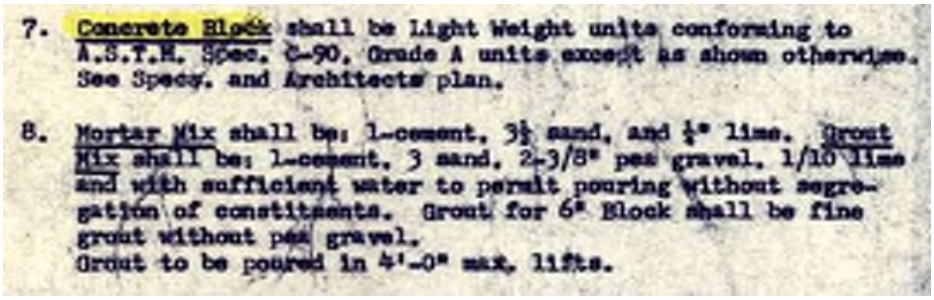
Existing Building Roof:

Compo & Gravel Roofing	5.0 psf
3 1/4" LW Conc	30.0 psf
9" conc slab	109.0 psf
10" hollow Core Plank	65.0 psf
Total Roof DL	**209.0** psf

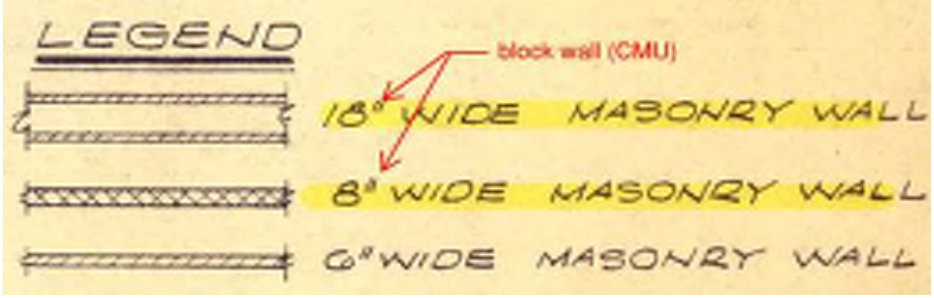
Existing Building Wall Weight:

(E) 18" CMU Wall, solid grout	175.0 psf
(E) 8" CMU Wall, solid grout	78.0 psf




7. Concrete Block shall be Light Weight units conforming to A.S.T.M. Spec. C-90, Grade A units except as shown otherwise. See Specs. and Architects plan.

8. Mortar Mix shall be: 1-cement, 3½ sand, and ½# lime. Grout Mix shall be: 1-cement, 3 sand, 2-3/8" pea gravel, 1/10 lime and with sufficient water to permit pouring without segregation of constituents. Grout for 6" Block shall be fine grout without pea gravel.
Grout to be poured in 4'-0" max. lifts.



Existing CMU Wall Lengths

18" Exterior Walls on X-DIR (ft):		18" Exterior Wall on Y-DIR (ft):	
	44		4.1
	68		6.9
	15.1		57.5
	10		23.7
	71.2		48.5
	16		11.3
SUM	224.3		152

8" Interior Walls on X-DIR (ft):		8" Interior Walsl on Y-DIR (ft):	
37.9 x 0.9 =	34.1		9.2
	4.1	17.1 x 0.9 =	15.4
85.9 X 0.9 =	77.3		14.4
	21.4		15.1
9.2 + 2.7 =	11.9	40.9 x 0.9 =	36.8
7.9 X 0.9 =	7.1		12.4
	12.5	29.6 x 0.9 =	26.6
	14.6		6.9
14.6 X 0.9 =	13.1		4.1
	25.3	29.7 x 0.9 =	26.7
	36.0		6.3
9.2 + 2.7 =	11.9		2.9
	8.1	74.3 x 0.9 =	66.9
	12.6		
	7.4		
9.2 + 2.7 =	9.1		
8 X 0.9 =	7.2		
	8.2		
SUM	321.9		243.7

Wall Height from SOG = 12'

Total Seismic Wall Wt on X Dir
= Half of Y-Dir Wall Wt
= 152' x 12' x 0.5 x 175 psf + 243.7' x 12' x 0.5 x 78 psf
= 274 kips

Total Seismic Wall Wt on Y Dir
= Half of X-Dir Wall Wt
= 224.3' x 12' x 0.5 x 175 psf + 321.9' x12' x 0.5 x 78 psf
= 386 kips

For individual wall, seismic from wall self weight to be added to the wall

New Addition Building Roof:

Roofing	3.0 psf
3 1/4" LW conc on 2" metal deck	42.3 psf
A/C Ceiling	4.0 psf
MEP	3.0 psf
Misc	2.7
Total Roof DL	**55.0** psf

New Building Wall Weight:

(N) 8" CMU Wall, solid grout	84.0 psf
(N) 8" CMU Wall, solid grout, w/ 2 7/8"" veneer	116.0 psf
(N) 10" CMU Wall, solid grout	104.0 psf

(N) Exterior Bearing Wall – East

(N) 8" CMU exterior wall w/ 2 7/8" veneer. 15' tall	1740 plf
Roof DL, tributary width 19' x 0.5 = 9.5'	523 plf
Total DL	2263 plf
Total Lr	190 plf

(N) Exterior Bearing Wall – North

(N) 8" CMU exterior wall w/ 2 7/8" veneer. 14' tall	1624 plf
Roof DL, tributary width 12'x 0.5 + 4.5' = 10.5'	578 plf
Total DL	2202 plf
Total Lr	210 plf

Total Seismic Wt of New Addition

Total Seismic Wt of New Addition on X-dir:

= Seismic Roof Wt + Seismic Wall Wt on X-dir

= 55 psf x 1000 sf x 0.5 + 31 kips (see the following pages)

= 59 kips = 2% of 2,545 kips for the existing building << 10%, OK

Total Seismic Wt of New Addition on Y-dir
(1/2 of New Addition, Attached to the Existing Building (thru the Existing 18" CMU Exterior Wall):

= Seismic Roof Wt + Seismic Wall Wt on Y-dir

= 55 psf x 1000 sf x 0.5 + 12.1 kips (see the following pages)

= 40 kips = 1% of 2,657 kips for the existing building << 10%, OK

Per the existing building code, if the seismic increase from new addition is less than 10% of seismic for the existing building, no seismic retrofit is needed.

Direct Shears

Direct shears due to V_y are depicted in Figure 2b. Walls take direct shear in proportion to their rigidity (or relative rigidity). As a result

$$V_j = V \frac{R_j}{\sum_{i \| V} R_i},$$

where here $\sum_{i \| V} R_i$ only includes the sum of rigidities for walls parallel to the direction of the applied shear, V. V_j is equal to zero for walls perpendicular to V. Table 5 illustrates the direct shear calculations.

Torsional Shears

$T = \text{Ve} =$ seismic shear times eccentricity $=$ torsion applied to the diaphragm

Generalizing the above solution for wall 1 to the solution for wall j and realizing that the denominator is J_p, yields

$$V_j = \frac{R_j d_j T}{\sum R_i d_i^2} = \frac{T R_j d_j}{J_p}. \tag{15}$$

Equation (15) can also be rewritten as x and y wall shears for each wall j.

$$V_{jx} = \frac{T R_{jx} \bar{y}_j}{J_p}, \quad V_{jy} = \frac{T R_{jy} \bar{x}_j}{J_p}. \tag{16}$$

Of course each wall only has an x shear or it only has a y shear depending on its orientation. The other shear direction (perpendicular to the wall) is zero.

New Addition Building Roof:

Roofing	3.0 psf
4 1/2" NW conc on 2" metal deck	70.0 psf
A/C Ceiling	4.0 psf
MEP	3.0 psf
Total Roof DL	80.0 psf

New Building Wall Weight:

(N) 8" CMU Wall, solid grout	84.0 psf
(N) 10" CMU Wall, solid grout	104.0 psf

New Addition CMU Wall Lengths

10" Exterior Walls on X-DIR (ft):		10" Exterior Wall on Y-DIR (ft):
	19.4	49
	19.4	
SUM	38.8	49

8" Interior Walls on X-DIR (ft):		8" Interior Walsl on Y-DIR (ft):
	0.0	0
SUM	0.0	0.0

Wall Height from SOG = 12'

Total Seismic Wall Wt on X Dir for New Addition
= Half of Y-Dir Wall Wt
= 49' x 12' x 0.5 x 104 psf
= 31 kips

Total Seismic Wall Wt on Y Dir (1/2 of New Addition, Attached to the Existing Building (thru the Existing 18" CMU Exterior Wall)
= Half of X-Dir Wall Wt / 2
= 38.8' x 12' x 0.5 x 0.5 x 104 psf
= 12.1 kips

For individual wall, seismic from wall self weight to be added to the wall

2. Loading Criteria, Framings, & Foundations

New Addition Building Roof:

Roofing	3.0 psf
3 1/4" LW conc on 2" metal deck	42.3 psf
A/C Ceiling	4.0 psf
MEP	3.0 psf
Misc	2.7
Total Roof DL	**55.0** psf

New Building Wall Weight:

(N) 8" CMU Wall, solid grout	84.0 psf
(N) 8" CMU Wall, solid grout, w/ 2 7/8"" veneer	116.0 psf
(N) 10" CMU Wall, solid grout	104.0 psf

(N) Exterior Bearing Wall – East

(N) 8" CMU exterior wall w/ 2 7/8" veneer. 15' tall	1740 plf
Roof DL, tributary width 19' x 0.5 = 9.5'	523 plf
Total DL	2263 plf
Total Lr	190 plf

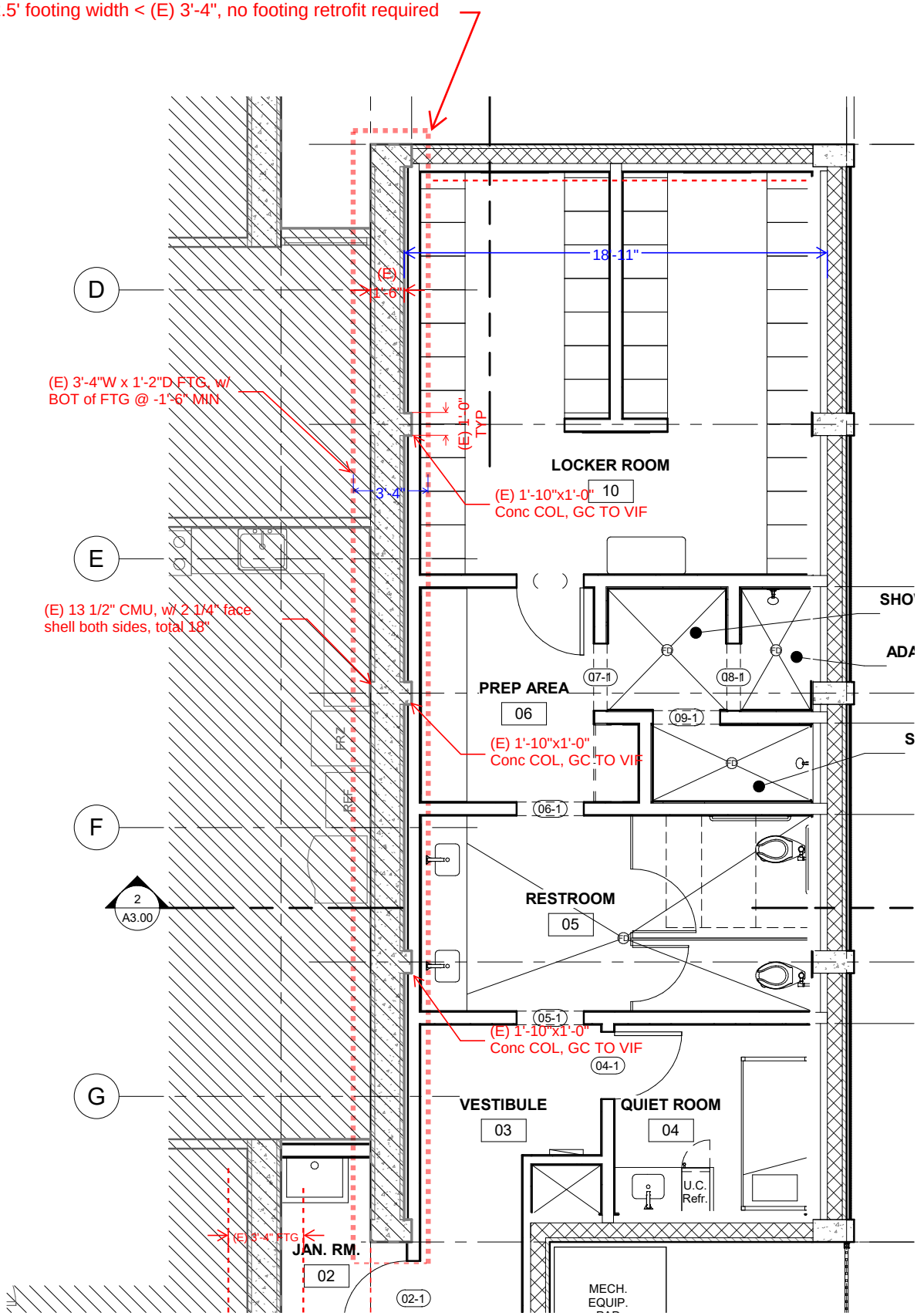
(N) Exterior Bearing Wall – North

(N) 8" CMU exterior wall w/ 2 7/8" veneer. 14' tall	1624 plf
Roof DL, tributary width 12'x 0.5 + 4.5' = 10.5'	578 plf
Total DL	2202 plf
Total Lr	210 plf

Checking (E) Footing on (E) Exterior Wall with (E) and (N) Loadings:

2000 psf allowable soil bearing for D+L shown on (E) dwg S-2

Total D + Lr from existing (E) and new (N)
= 209 psf x 19' x 0.5 (existing D) + 55 psf x 19' x 0.5 for (new D) + 20 psf x (19' + 19') x 0.5 for (N) & (E) roof Lr + 175 psf x 12' (E 18" wall D)
= 5.0 k/ft
5.0 / 2.0 = 2.5' footing width < (E) 3'-4", no footing retrofit required



Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Calcs.ec6

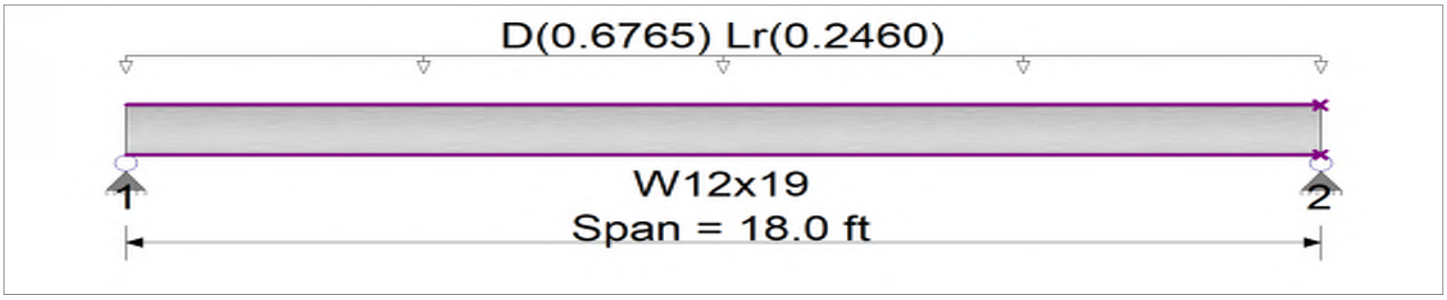
DESCRIPTION: Roof beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	50.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Uniform Load : D = 0.0550, Lr = 0.020 ksf, Tributary Width = 12.30 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.619 : 1	Maximum Shear Stress Ratio =	0.148 : 1
Section used for this span	W12x19	Section used for this span	W12x19
Ma : Applied	38.131 k-ft	Va : Applied	8.474 k
Mn / Omega : Allowable	61.627 k-ft	Vn/Omega : Allowable	57.340 k
Load Combination	+D+Lr	Load Combination	+D+Lr
		Location of maximum on span	0.000 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.155 in	Ratio =	1,395	>=360	Span: 1 : Lr Only
Max Upward Transient Deflection	0 in	Ratio =	0	<360	n/a
Max Downward Total Deflection	0.593 in	Ratio =	365	>=240.	Span: 1 : +D+Lr
Max Upward Total Deflection	0 in	Ratio =	0	<240.0	n/a

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	Vnx	Vnx/Omega
D Only													
Dsgn. L = 18.00 ft	1	0.457	0.109	28.17		28.17	102.92	61.63	1.00	1.00	6.26	86.01	57.34
+D+Lr													
Dsgn. L = 18.00 ft	1	0.619	0.148	38.13		38.13	102.92	61.63	1.00	1.00	8.47	86.01	57.34
+D+0.750Lr													
Dsgn. L = 18.00 ft	1	0.578	0.138	35.64		35.64	102.92	61.63	1.00	1.00	7.92	86.01	57.34
+0.60D													
Dsgn. L = 18.00 ft	1	0.274	0.065	16.90		16.90	102.92	61.63	1.00	1.00	3.76	86.01	57.34

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.5926	9.051		0.0000	0.000

Vertical Reactions

Support notation : Far left is #: Values in KIPS

Load Combination	Support 1	Support 2
Max Upward from all Load Conditions	8.474	8.474
Max Upward from Load Combinations	8.474	8.474
Max Upward from Load Cases	6.260	6.260
D Only	6.260	6.260
+D+Lr	8.474	8.474
+D+0.750Lr	7.920	7.920
+0.60D	3.756	3.756
Lr Only	2.214	2.214

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Calcs.ec6

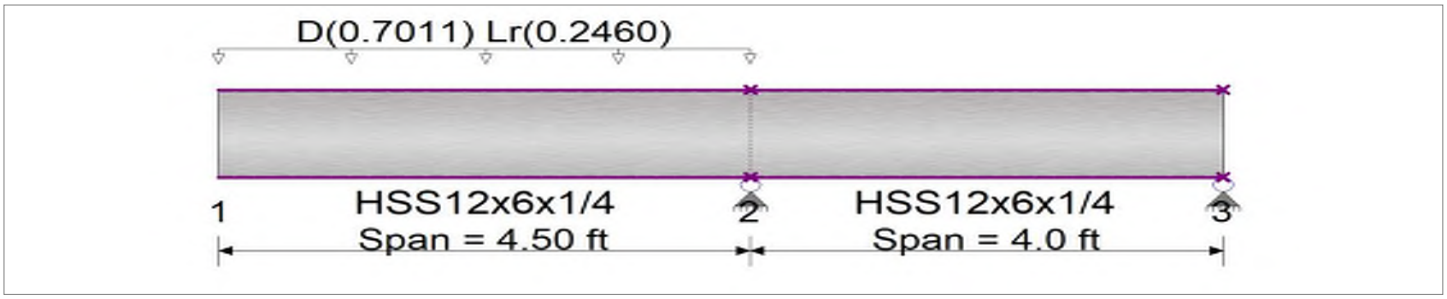
DESCRIPTION: Roof outrigger beam

CODE REFERENCES

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combination Set : ASCE 7-16

Material Properties

Analysis Method :	Allowable Strength Design	Fy : Steel Yield :	46.0 ksi
Beam Bracing :	Beam is Fully Braced against lateral-torsional buckling	E: Modulus :	29,000.0 ksi
Bending Axis :	Major Axis Bending		



Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Beam self weight calculated and added to loading
Load for Span Number 1
Uniform Load : D = 0.0570, Lr = 0.020 ksf, Tributary Width = 12.30 ft

DESIGN SUMMARY

Design OK

Maximum Bending Stress Ratio =	0.138 : 1	Maximum Shear Stress Ratio =	0.050 : 1
Section used for this span	HSS12x6x1/4	Section used for this span	HSS12x6x1/4
Ma : Applied	9.885 k-ft	Va : Applied	4.393 k
Mn / Omega : Allowable	71.387 k-ft	Vn/Omega : Allowable	87.035 k
Load Combination	+D+Lr	Load Combination	+D+Lr
		Location of maximum on span	4.500 ft
Span # where maximum occurs	Span # 1	Span # where maximum occurs	Span # 1

Maximum Deflection

Max Downward Transient Deflection	0.011 in	Ratio =	9,920	>=360	Span: 2 : Lr Only
Max Upward Transient Deflection	-0.001 in	Ratio =	47,089	>=360	Span: 2 : Lr Only
Max Downward Total Deflection	0.043 in	Ratio =	2508	>=240.	Span: 2 : +D+Lr
Max Upward Total Deflection	-0.004 in	Ratio =	11976	>=240.	Span: 2 : +D+Lr

Maximum Forces & Stresses for Load Combinations

Load Combination / Segment Length	Span #	Max Stress Ratios M	V	Summary of Moment Values Mmax +	Mmax -	Ma Max	Mnx	Mnx/Omega	Cb	Rm	Summary of Shear Values Va Max	VnxVnx/Omega
D Only												
Dsgn. L = 4.50 ft	1	0.104	0.038		-7.39	7.39	119.22	71.39	1.00	1.00	3.29	145.35 87.04
Dsgn. L = 4.00 ft	2	0.104	0.022		-7.39	7.39	119.22	71.39	1.00	1.00	1.91	145.35 87.04
+D+Lr												
Dsgn. L = 4.50 ft	1	0.138	0.050		-9.89	9.89	119.22	71.39	1.00	1.00	4.39	145.35 87.04
Dsgn. L = 4.00 ft	2	0.138	0.029		-9.89	9.89	119.22	71.39	1.00	1.00	2.53	145.35 87.04
+D+0.750Lr												
Dsgn. L = 4.50 ft	1	0.130	0.047		-9.26	9.26	119.22	71.39	1.00	1.00	4.12	145.35 87.04
Dsgn. L = 4.00 ft	2	0.130	0.027		-9.26	9.26	119.22	71.39	1.00	1.00	2.37	145.35 87.04
+0.60D												
Dsgn. L = 4.50 ft	1	0.062	0.023		-4.44	4.44	119.22	71.39	1.00	1.00	1.97	145.35 87.04
Dsgn. L = 4.00 ft	2	0.062	0.013		-4.44	4.44	119.22	71.39	1.00	1.00	1.14	145.35 87.04

Overall Maximum Deflections

Load Combination	Span	Max. "-" Defl	Location in Span	Load Combination	Max. "+" Defl	Location in Span
+D+Lr	1	0.0431	0.000		0.0000	0.000
	2	0.0000	0.000	+D+Lr	-0.0040	1.696

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Upward from all Load Conditions		6.923	
Max Upward from Load Combinations		6.923	
Max Upward from Load Cases		5.194	

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Beam

Project File: Calcs.ec6

DESCRIPTION: Roof outrigger beam

Vertical Reactions

Support notation : Far left is #1 Values in KIPS

Load Combination	Support 1	Support 2	Support 3
Max Downward from all Load Conditions (Resis			-2.413
Max Downward from Load Combinations (Resi			-2.413
Max Downward from Load Cases (Resisting Up			-1.790
D Only		5.194	-1.790
+D+Lr		6.923	-2.413
+D+0.750Lr		6.491	-2.257
+0.60D		3.116	-1.074
Lr Only		1.730	-0.623

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

Project File: Calcs.ec6

DESCRIPTION: Bearing wall footing

Code References

Calculations per ACI 318-14, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

Material Properties

f'c : Concrete 28 day strength	=	3.0 ksi
fy : Rebar Yield	=	60.0 ksi
Ec : Concrete Elastic Modulus	=	3,122.0 ksi
Concrete Density	=	145.0 pcf
φ Values Flexure	=	0.90
Shear	=	0.750

Analysis Settings

Min Steel % Bending Reinf.	=	
Min Allow % Temp Reinf.	=	0.00180
Min. Overturning Safety Factor	=	1.0 : 1
Min. Sliding Safety Factor	=	1.0 : 1
AutoCalc Footing Weight as DL :		Yes

Soil Design Values

Allowable Soil Bearing	=	1.50 ksf
Increase Bearing By Footing Weight	=	No
Soil Passive Resistance (for Sliding)	=	250.0 pcf
Soil/Concrete Friction Coeff.	=	0.30

Increases based on footing Depth

Reference Depth below Surface	=	ft
Allow. Pressure Increase per foot of depth	=	ksf
when base footing is below	=	ft

Increases based on footing Width

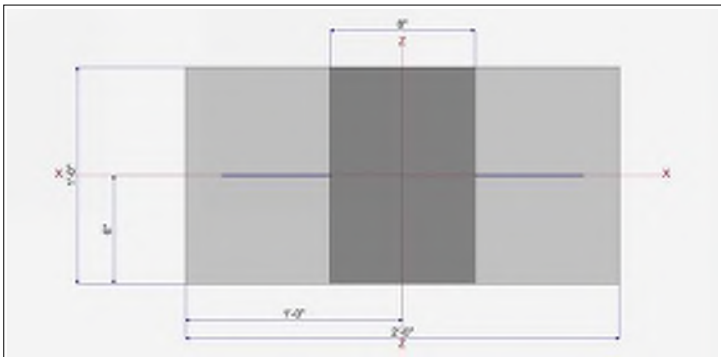
Allow. Pressure Increase per foot of width	=	ksf
when footing is wider than	=	ft

Adjusted Allowable Bearing Pressure = 1.50 ksf

Dimensions

Footing Width	=	2 ft	Footing Thickness	=	12.0 in	Bars along X-X Axis	
Wall Thickness	=	8.0 in	Rebar Centerline to Edge of Concrete...			Bar spacing	= 12.00
Wall center offset from center of footing	=	0 in	at Bottom of footing	=	3.0 in	Reinforcing Bar Size	= # 5

Reinforcing



Applied Loads

		D	Lr	L	S	W	E	H
P : Column Load	=	2.30	0.20	0.0	0.0	0.0	0.0	0.0 k
OB : Overburden	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 ksf
V-x	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k
M-zz	=	0.0	0.0	0.0	0.0	0.0	0.0	0.0 k-ft

Vx applied = 0.0 in above top of footing

Project Title:
Engineer:
Project ID:
Project Descr:

Wall Footing

Project File: Calcs.ec6

DESCRIPTION: Bearing wall footing

DESIGN SUMMARY

Design OK

	Factor of Safety	Item	Applied	Capacity	Governing Load Combination
PASS	n/a	Overturning - Z-Z	0.0 k-ft	0.0 k-ft	No Overturning
PASS	n/a	Sliding - X-X	0.0 k	0.0 k	No Sliding
PASS	n/a	Uplift	0.0 k	0.0 k	No Uplift

	Utilization Ratio	Item	Applied	Capacity	Governing Load Combination
PASS	0.930	Soil Bearing	1.395 ksf	1.50 ksf	+D+Lr
PASS	0.03321	Z Flexure (+X)	0.4029 k-ft	12.131 k-ft	+1.40D
PASS	0.02135	Z Flexure (-X)	0.2590 k-ft	12.131 k-ft	+0.90D
PASS	n/a	1-way Shear (+X)	0.0 psi	82.158 psi	n/a
PASS	0.0	1-way Shear (-X)	0.0 psi	0.0 psi	n/a

Detailed Results

Soil Bearing

Rotation Axis & Load Combination...	Gross Allowable	Xecc	Actual Soil Bearing Stress -X	Actual Soil Bearing Stress +X	Actual / Allowable Ratio
, D Only	1.50 ksf	0.0 in	1.295 ksf	1.295 ksf	0.863
, +D+Lr	1.50 ksf	0.0 in	1.395 ksf	1.395 ksf	0.930
, +D+0.750Lr	1.50 ksf	0.0 in	1.370 ksf	1.370 ksf	0.913
, +0.60D	1.50 ksf	0.0 in	0.7770 ksf	0.7770 ksf	0.518

Overturning Stability

Units : k-ft

Rotation Axis & Load Combination...	Overturning Moment	Resisting Moment	Stability Ratio	Status
Footing Has NO Overturning				

Sliding Stability

Force Application Axis Load Combination...	Sliding Force	Resisting Force	Sliding SafetyRatio	Status
Footing Has NO Sliding				

Footing Flexure

Flexure Axis & Load Combination	Mu k-ft	Which Side ?	Tension @ Bot. or Top ?	As Req'd in^2	Gvrn. As in^2	Actual As in^2	Phi*Mn k-ft	Status
, +1.40D	0.4029	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.40D	0.4029	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50Lr	0.3564	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+0.50Lr	0.3564	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D	0.3453	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D	0.3453	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60Lr	0.3809	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +1.20D+1.60Lr	0.3809	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +0.90D	0.259	-X	Bottom	0.2592	Min Temp %	0.31	12.131	OK
, +0.90D	0.259	+X	Bottom	0.2592	Min Temp %	0.31	12.131	OK

One Way Shear

Units : k

Load Combination...	Vu @ -X	Vu @ +X	Vu:Max	Phi Vn	Vu / Phi*Vn	Status
+1.40D	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+0.50Lr	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D	0 psi	0 psi	0 psi	82.158 psi	0	OK
+1.20D+1.60Lr	0 psi	0 psi	0 psi	82.158 psi	0	OK
+0.90D	0 psi	0 psi	0 psi	82.158 psi	0	OK

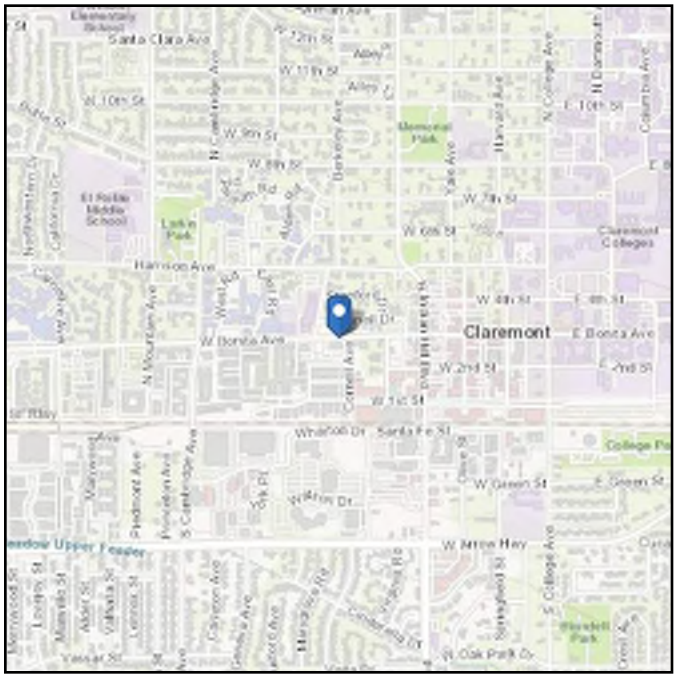
3. Seismic for New Addition

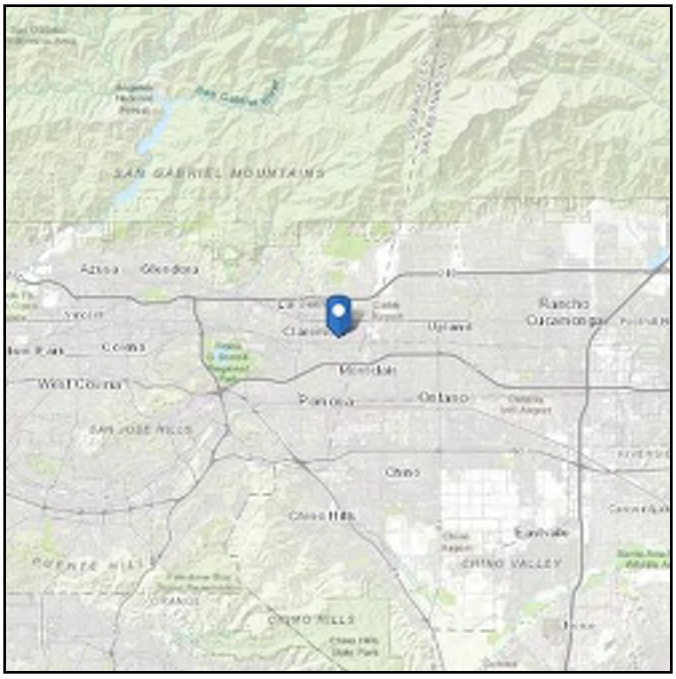
ASCE Hazards Report

Address:
570 W Bonita Ave
Claremont, California
91711

Standard: ASCE/SEI 7-16
Risk Category: IV
Soil Class: D - Default (see Section 11.4.3)

Latitude: 34.096472
Longitude: -117.722386
Elevation: 1157.8468633175028 ft (NAVD 88)





Seismic

Site Soil Class: D - Default (see Section 11.4.3)

Results:

=1.7[a]

S_S :	1.706	S_{D1} :	~~N/A~~ (=(2/3) x S_{M1} = 0.72)
S_1 :	0.638	T_L :	8
F_a :	1.2	PGA :	0.727
F_v :	N/A	PGA_M :	0.872
S_{MS} :	2.048 (=Fa x Ss)	F_{PGA} :	1.2
S_{M1} :	~~N/A~~ = (Fv x S1 = 1.08)	I_e :	1.5
S_{DS} :	1.365 (=(2/3) x S_{Ms})	C_v :	1.441

Ground motion hazard analysis may be required. See ASCE/SEI 7-16 Section 11.4.8.

Data Accessed: Fri Jul 19 2024

Date Source: USGS Seismic Design Maps

Where Site Class D is selected as the default site class per Section 11.4.3, the value of Fa shall not be less than 1.2.

[a]Also, see requirements for site-specific ground motions in Section 11.4.8.

Note: This is the reason why S_{M1} and S_{D1} are shown as N/A: need to check Section 11.4.8 (see the following page)

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ASCE7-16:

11.4.8 Site-Specific Ground Motion Procedures. A site response analysis shall be performed in accordance with Section 21.1 for structures on Site Class F sites, unless exempted in accordance with Section 20.3.1. A ground motion hazard analysis shall be performed in accordance with Section 21.2 for the following:

1. seismically isolated structures and structures with damping systems on sites with S_1 greater than or equal to 0.6,
2. structures on Site Class E sites with S_s greater than or equal to 1.0, and.
3. structures on Site Class D and E sites with S_1 greater than or equal to 0.2. (S1 = 0.638)

EXCEPTION: A ground motion hazard analysis is not required for structures other than seismically isolated structures and structures with damping systems where:

1. Structures on Site Class E sites with S_S greater than or equal to 1.0, provided the site coefficient F_a is taken as equal to that of Site Class C.
2. Structures on Site Class D sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Eq. (12.8-2) for values of $T \le 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \ge T > 1.5T_s$ or Eq. (12.8-4) for $T > T_L$.
3. Structures on Site Class E sites with S_1 greater than or equal to 0.2, provided that T is less than or equal to T_s and the equivalent static force procedure is used for design.

It shall be permitted to perform a site response analysis in accordance with Section 21.1 and/or a ground motion hazard analysis in accordance with Section 21.2 to determine ground motions for any structure.

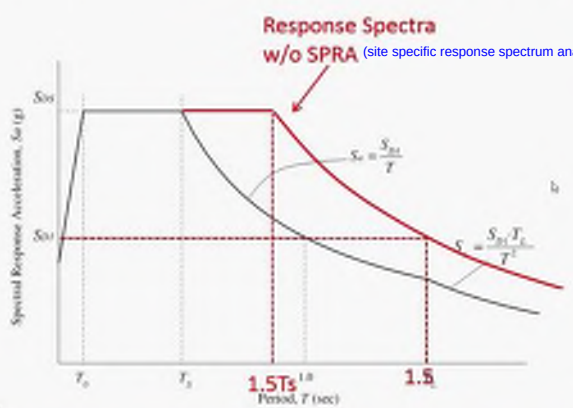
= 0.72 / 1.365 = 0.53

$T_S = S_{D1}/S_{DS}$, and
T_L = long-period transition period(s) shown in Figs. 22-14 through 22-17.

T = 0.20 (see following page) < 1.5 Ts = 0.80
Use Exception 2 and Eq (12.8-2)

Exception 2 of Section 11.4.8

2. Structures on Site Class D sites with S_1 greater than or equal to 0.2, provided the value of the seismic response coefficient C_s is determined by Eq. (12.8-2) for values of $T \le 1.5T_s$ and taken as equal to 1.5 times the value computed in accordance with either Eq. (12.8-3) for $T_L \ge T > 1.5T_s$ or Eq. (12.8-4) for $T > T_L$.



$$C_s = \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} \quad (12.8\text{-}2)$$

$$C_s = \frac{1.5S_{D1}}{T\left(\frac{R}{I_e}\right)} \quad (12.8\text{-}3)$$

$$C_s = \frac{1.5S_{D1}T_L}{T^2\left(\frac{R}{I_e}\right)} \quad (12.8\text{-}4)$$

Economic Solutions for Complex Problems

ASCE7-16:

12.8 EQUIVALENT LATERAL FORCE (ELF) PROCEDURE

12.8.1 Seismic Base Shear. The seismic base shear, V, in a given direction shall be determined in accordance with the following equation:

$$V = C_s W \tag{12.8-1}$$

$$C_s = \frac{S_{DS}}{\left(\frac{R}{I_e}\right)} \tag{12.8-2}$$

The value of C_s computed in accordance with Eq. (12.8-2) need not exceed the following:

for $T \le T_L$

$$C_s = \frac{S_{D1}}{T\left(\frac{R}{I_e}\right)} \tag{12.8-3}$$

for $T > T_L$

$$C_s = \frac{S_{D1} T_L}{T^2\left(\frac{R}{I_e}\right)} \tag{12.8-4}$$

C_s shall not be less than

$$C_s = 0.044 S_{DS} I_e \ge 0.01 \tag{12.8-5}$$

In addition, for structures located where S_1 is equal to or greater than $0.6g$, C_s shall not be less than

$$C_s = 0.5 S_1 / (R/I_e) \tag{12.8-6}$$

For Special Reinforced Masonry Shear:

Cs = 1.37 /5 = 0.27 (strength level) (12.8-2)

hn = 13.5', Ta = 0.14, T = CuTa = 1.4x0.14 = 0.20

Cs, max = 0.72 / (0.20x5) = 0.72 (12.8-3)

Cs, min = 0.044 x 1.37 = 0.06 (12.8-5)

Cs, min = 0.5 x 0.638 / 5 = 0.06 (12.8-6)

=> CS = 0.27 x 1.5 = 0.41 (strength level)

Importance factor of 1.5 is used here.

12.8.2 Period Determination. The fundamental period of the structure, T, in the direction under consideration shall be established using the structural properties and deformational characteristics of the resisting elements in a properly substantiated analysis. The fundamental period, T, shall not exceed the product of the coefficient for upper limit on calculated period (C_u) from Table 12.8-1 and the approximate fundamental period, T_a, determined in accordance with Section 12.8.2.1. As an alternative to performing an analysis to determine the fundamental period, T, it is permitted to use the approximate building period, T_a, calculated in accordance with Section 12.8.2.1, directly.

12.8.2.1 Approximate Fundamental Period. The approximate fundamental period (T_a), in seconds, shall be determined from the following equation:

$$T_a = C_t h_n^x \tag{12.8-7}$$

where h_n is the structural height as defined in Section 11.2 and the coefficients C_t and x are determined from Table 12.8-2.

Alternatively, it is permitted to determine the approximate fundamental period (T_a), in seconds, from the following equation

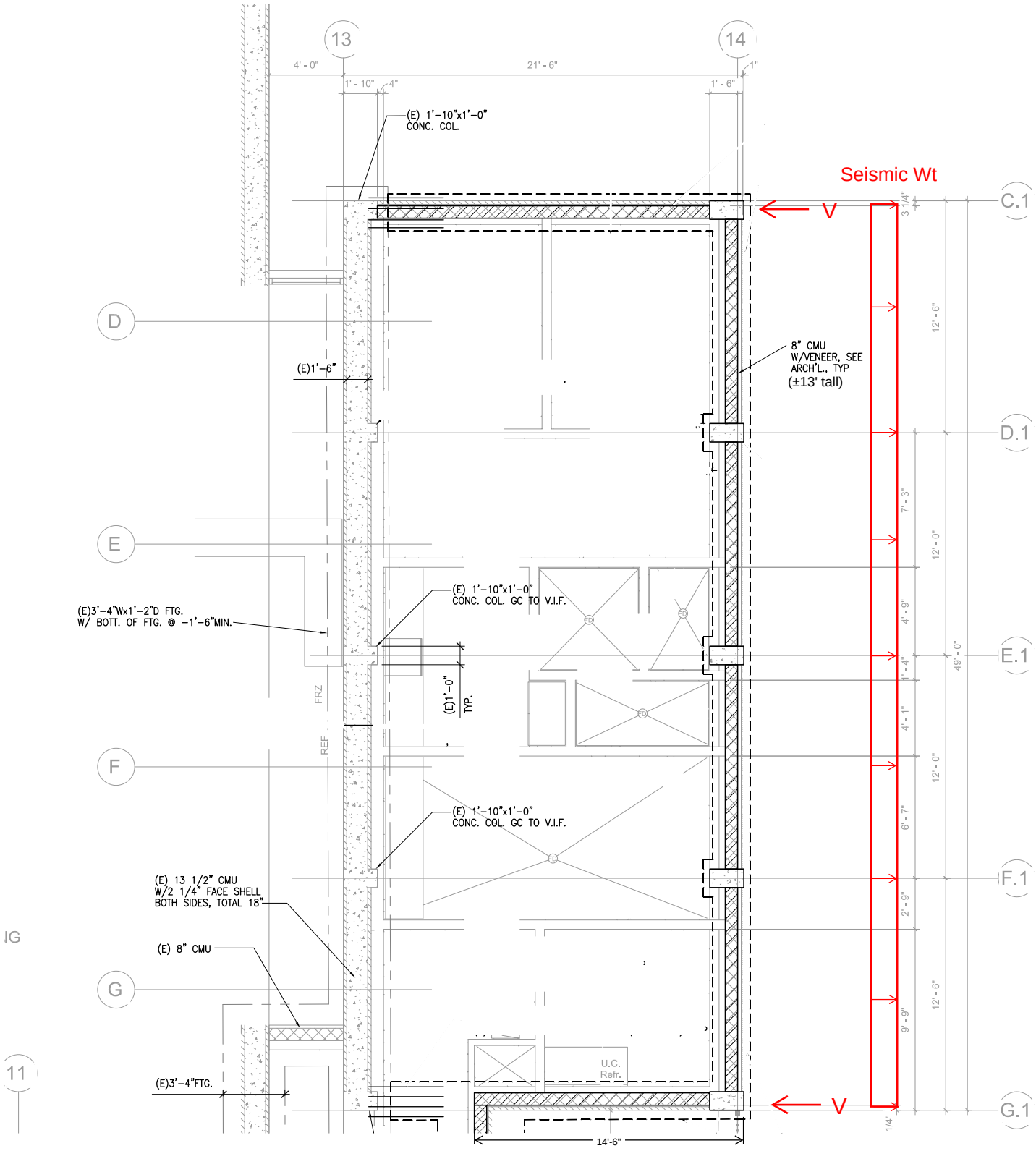
Table 12.8-1 Coefficient for Upper Limit on Calculated Period

Design Spectral Response Acceleration Parameter at 1 s, S_{D1}	Coefficient C_u
≥0.4	1.4
0.3	1.4
0.2	1.5
0.15	1.6
≤0.1	1.7

Table 12.8-2 Values of Approximate Period Parameters C_t and x

Structure Type	C_t	x
Moment-resisting frame systems in which the frames resist 100% of the required seismic force and are not enclosed or adjoined by components that are more rigid and will prevent the frames from deflecting where subjected to seismic forces:		
Steel moment-resisting frames	0.028 (0.0724)[a]	0.8
Concrete moment-resisting frames	0.016 (0.0466)[a]	0.9
Steel eccentrically braced frames in accordance with Table 12.2-1 lines B1 or D1	0.03 (0.0731)[a]	0.75
Steel buckling-restrained braced frames	0.03 (0.0731)[a]	0.75
All other structural systems	0.02 (0.0488)[a]	0.75

[a]Metric equivalents are shown in parentheses.



Seismic Wt on X-dir
= 55 psf x 20' (roof) + 116 psf x 13' x 0.5 (8" CMU wall w/ veneer) + 5 psf x 20' (partition) = 1954 plf

q = Cs x Wt = 0.41 x 1954 = 801 plf (strength level)

V = .801 x 49' x 0.5 = 19.6k (strength level)

Project Title:
Engineer:
Project ID:
Project Descr:

Masonry Shear Wall

Project File: Calcs.ec6

DESCRIPTION: CMU shear wall at worst location on grid G.1

Code References

Calculations per TMS 402-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

Wall Material	MASONRY	f'm	1.90 ksi	Block Class	
Total Wall Height	13.0 ft	Fy - Rebar	60.0 ksi	Concrete Density	150.0 pcf
Base Wall Length	14.50 ft	Fy - HJR	70.0 ksi	Min. Bending As %	0.00180
R: Resp. Mod Factor		Em	3,120.0 ksi		
Ie: Seismic Import. Factor	1.0	Phi - Shear	0.80	Phi : Axial & Flexure	0.90

Wall Data

	Bottom
Analysis Height	0.00 ft
Wall Offset	(datum) ft
Wall Length	14.50 ft
Effective Length 'd'	166.0 in
Nominal Block Thickness	8 in
Solid Grout?	Solid Grouted

Reinforcing in Field of Wall

Vertical Bar Size #	5
Vertical Bar Spacing	16 in
Horiz. joint reinf. area (HJR)	0.31 in
HJR Spacing	24 in
Bond beam reinf. area	0.4 in
Spacing of bond beams	48 in

In each chord cell:

Vertical rebar size #	4
# Chord Cells @ Each End	2

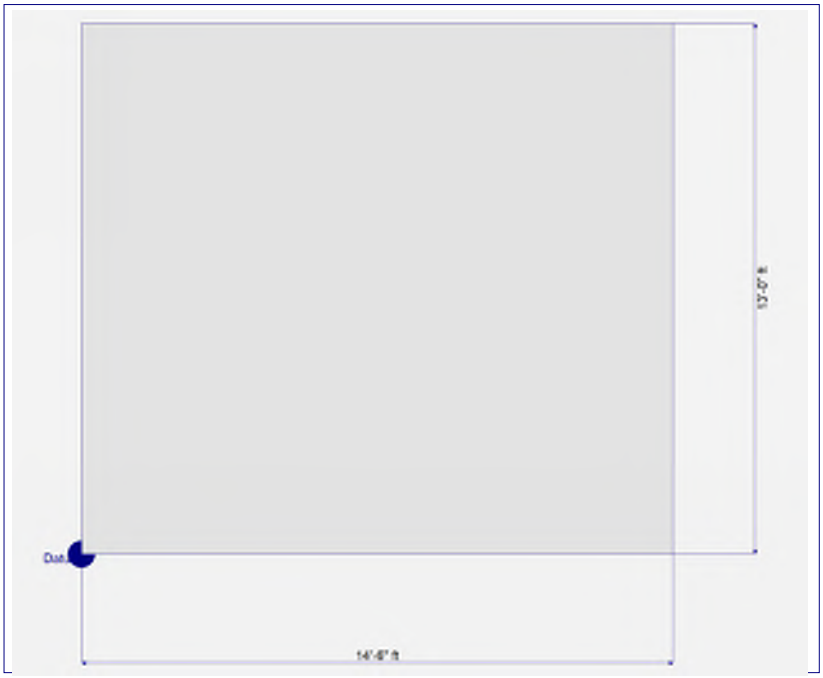
Project Title:
Engineer:
Project ID:
Project Descr:

Masonry Shear Wall

Project File: Calcs.ec6

DESCRIPTION: CMU shear wall at worst location on grid G.1

Wall Sketch



Applied Distributed Vertical Loads

Load Location (ft)			Load Magnitude (kips)				
Start Location	End Location	Height of Application	Dead Load	Roof Live Load	Live Load	Snow Load	Earth Load
0.0	14.50	13.0	0.3440	0.1250	0.0	0.0	0.0

Applied Distributed Lateral Loads

Load Location (ft)		Load Magnitude (kips)					
X Location	Y Location	Dead Load	Roof Live Load	Floor Live Load	Wind Load	Seismic Load	Earth Load
0.0	14.50	0.0	0.0	0.0	0.0	1.350	0.0

SHEAR ANALYSIS

	Bottom Level
Special Boundary Elements Req'd?	Not Req'd
Vu : Story Shear	19.575 k
for Load Combination	+1.20D+E
Anv	1,322.40 in^2
Controlling Mu/(Vud)	0.50
Vn Masonry	187.551 k
Vn Steel	87.620 k
Vn Masonry + Vn Steel	275.171 k
Vn Max	307.424 k
Phi Vn	220.137 k
Ratio: Vu/PhiVn (controlling)	**0.08892**
Vertical As >= Av/3	OK
Vertical Bar Spacing <= 96"	OK

Project Title:
Engineer:
Project ID:
Project Descr:

Masonry Shear Wall

Project File: Calcs.ec6

DESCRIPTION: CMU shear wall at worst location on grid G.1

AXIAL ANALYSIS

	Bottom Level
H / d Ratio	0.94
Pu	29.679 k
for Load Combination	+1.40D
Phi Pn	+1.40D k
Ratio: Pu/PhiPn (controlling)	**0.01599**

BENDING ANALYSIS

	Bottom Level
"a" : Flexural compression	2.07 in
Length of defined chord zone is >= the "a" dimension of the masonry (the compression zone)	OK
"d" : Eff depth to tension reinf	166.0
As-flex < As-max ?	d<=1, R<=1.5
Mu	141.919 k
for Load Combination	+1.20D+E
Phi Mn	296.936 k
Ratio: Mu/PhiMn (controlling)	**0.4779**

Force Summary

Load Combination / Wall Level	Values for Wall section Vu (k)	Mu (k)	Pu (k)	Resultant Ecc (ft)	Overturning Ratio	Uplift (k) Left	Right
+1.40D							
Wall Level : 1			29.679				
+1.20D+0.50Lr							
Wall Level : 1			26.345				
+1.20D							
Wall Level : 1			25.439				
+1.20D+1.60Lr							
Wall Level : 1			28.339				
+0.90D							
Wall Level : 1			19.079				
+1.20D+E							
Wall Level : 1	19.575	141.919	25.439	5.579	1.300		
+0.90D+E							
Wall Level : 1	19.575	141.919	19.079	7.438	0.975	0.260	0.260

Project Title:
Engineer:
Project ID:
Project Descr:

Masonry Shear Wall

Project File: Calcs.ec6

DESCRIPTION: CMU shear wall at worst location on grid G.1

Footing Information

Footing Dimensions

Dist. Left	1.0 ft	f'c	3.0 ksi	Rebar Cover	3.0 in
Wall Length	14.50 ft	Fy	60.0 ksi	Footing Thickness	12.0 in
Dist. Right	1.0 ft			Width	2.0 ft
Total Ftg Length	16.50 ft				

Max Factored Soil Pressures

@ Left Side of Footing	1,110.16	psf
.... governing load comb	+1.40D	
@ Right Side of Footing	1,110.16	psf
.... governing load comb	+1.40D	

Max UNfactored Soil Pressures

@ Left Side of Footing	847.90	psf
.... governing load comb	+D+Lr	
@ Right Side of Footing	847.90	psf
.... governing load comb	+D+Lr	

Footing One-Way Shear Check...

vu @ Left End of Footing	3.023 psi
Phi * vn : Allowable	82.158 psi
vu / Phi * vn	0.04
vu @ Right End of Footing	3.023 psi
Phi * vn : Allowable	82.16 psi
vu / Phi * vn	0.04

Overturning Stability...

	@ Left End of Ftg	@ Right End of Ftg
Overturning Moment	9.160 k-ft	9.160 k-ft
Resisting Moment	124.537 k-ft	124.537 k-ft
Stability Ratio	13.595 : 1	13.595 : 1
.... governing load comb	+0.60D+0.70E	+0.60D+0.70E

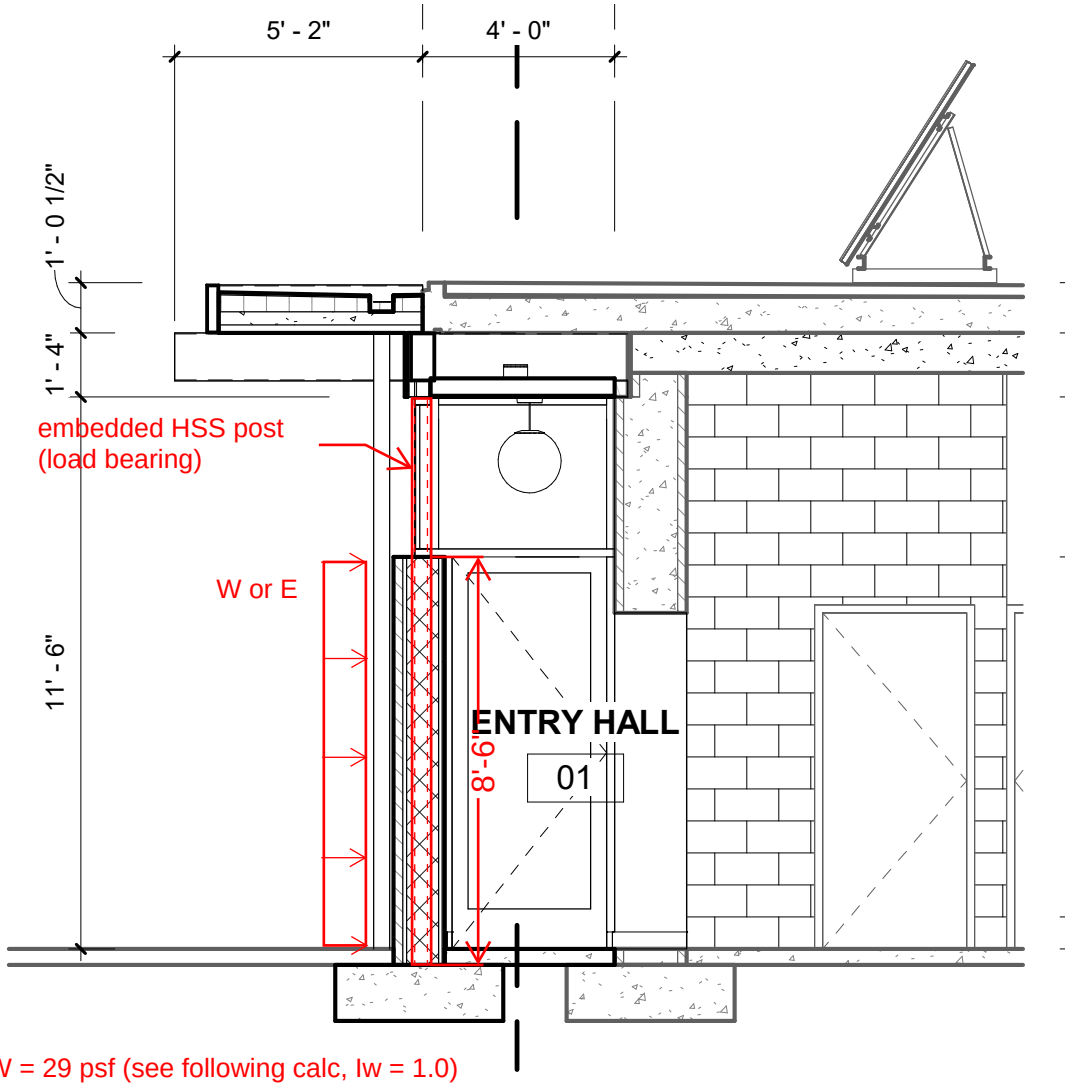
Footing Bending Design...

	@ Left End	@ Right End
Mu	1.110 k-ft	1.110 k-ft
Ru	7.614 psi	7.614 psi
As % Req'd	0.00180 in^2	0.00180 in^2
As Req'd in Footing Width	0.5184 in^2	0.5184 in^2

this is foundation check for the CMU shear wall

4. Embedded HSS Posts and Cantilevered CMU Walls

Lateral loads on Cantilevered CMU wall:



W = 29 psf (see following calc, Iw = 1.0)

E = 95 psf (see following calc, I_E = 1.5)

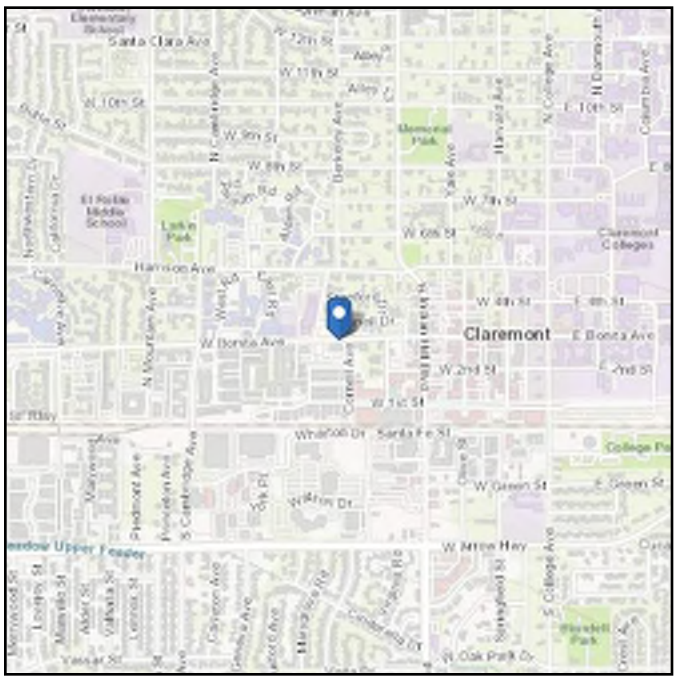
seismic control

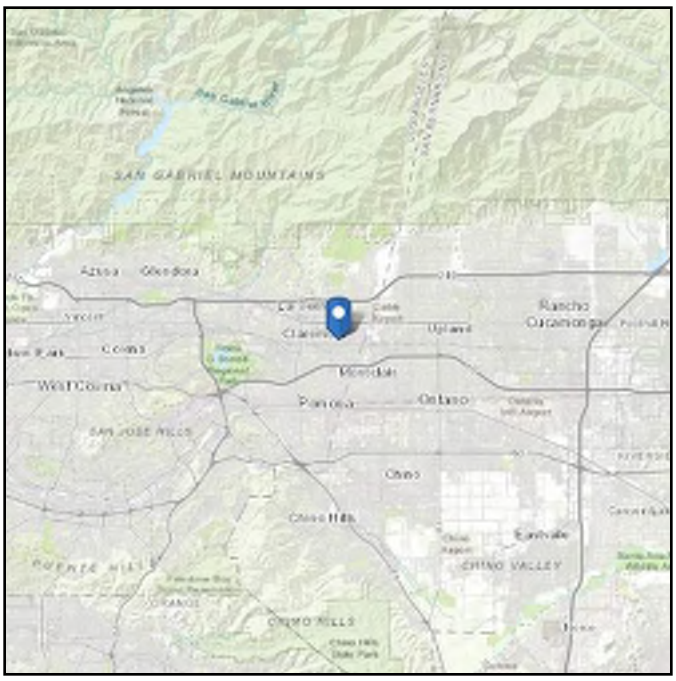
ASCE Hazards Report

Address:
570 W Bonita Ave
Claremont, California
91711

Standard: ASCE/SEI 7-16
Risk Category: IV
Soil Class: D - Default (see Section 11.4.3)

Latitude: 34.096472
Longitude: -117.722386
Elevation: 1157.8468633175028 ft (NAVD 88)





Wind

Results:

Wind Speed	106 Vmph
10-year MRI	66 Vmph
25-year MRI	72 Vmph
50-year MRI	77 Vmph
100-year MRI	81 Vmph

Data Source: ASCE/SEI 7-16, Fig. 26.5-1D and Figs. CC.2-1–CC.2-4, and Section 26.5.2
Date Accessed: Mon Aug 05 2024

Value provided is 3-second gust wind speeds at 33 ft above ground for Exposure C Category, based on linear interpolation between contours. Wind speeds are interpolated in accordance with the 7-16 Standard. Wind speeds correspond to approximately a 1.6% probability of exceedance in 50 years (annual exceedance probability = 0.00033, MRI = 3,000 years).

Site is not in a hurricane-prone region as defined in ASCE/SEI 7-16 Section 26.2.

The ASCE Hazard Tool is provided for your convenience, for informational purposes only, and is provided “as is” and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

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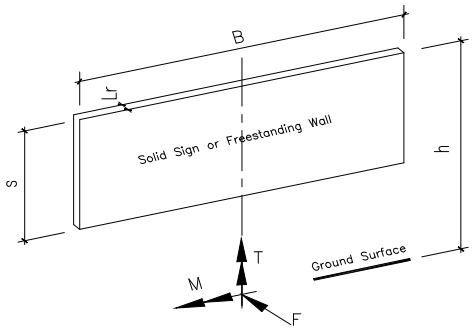
WHEELER & GRAY CONSULTING ENGINEERS

PROJECT : | PAGE :
CLIENT : | DESIGN BY :
JOB NO. : | DATE : | REVIEW BY :

Wind Analysis for Freestanding Wall & Sign Based on ASCE 7-22

INPUT DATA

Exposure category (B, C or D)		=	B	
Importance factor, 1.0 only, (Table 1.5-2)	I_w	=	1.00	
Basic wind speed (ASCE 7 26.5.1)	V =	106	*mph, (170.59 kph)*	
Topographic factor (26.8 & Table 26.8-1)	K_{zt}	=	1	Flat
Height of top	h =	8.5	*ft, (2.59 m)*	
Vertical dimension (for wall, s = h)	s =	8.5	*ft, (2.59 m)*	
Horizontal dimension	B =	38.1	*ft, (11.61 m)*	
Dimension of return corner	L_r =	13	*ft, (3.96 m)*	



DESIGN SUMMARY

Max horizontal wind pressure	p	=	29 *psf, (1395 N/m²)*
Max total horizontal force at centroid of base	F	=	6.36 *kips, (28 kN)*
Max bending moment at centroid of base	M	=	29.73 *ft-kips, (40 kN-m)*
Max torsion at centroid of base	T	=	48.46 *ft-kips, (66 kN-m)*

ANALYSIS

Velocity pressure

$q_h K_d = (0.00256 K_z K_{zt} K_e V^2) K_d$ = **17.11** psf

where: q_h = velocity pressure at mean roof height, h. (Eq. 26.10-1 page 277), K_e = **1.00**, (Tab. 26.9-1 page 275)

K_h = velocity pressure exposure coefficient evaluated at height, h, (Tab. 26.10-1, pg 277) = **0.70**

K_d = wind directionality factor. (Tab. 26.6-1, page 274) = **0.85**

h = height of top = **8.50** ft

Wind Force Case A: resultant force though the geometric center (Sec. 29.3.1)

$p = q_h K_d G C_N$	=	**20**	psf
$F = p A_s$	=	**6.36**	kips
M = F (h - 0.5s) for sign, F (0.55h) for wall	=	**29.73**	ft-kips
T =	=	**0.00**	ft-kips

where: G = gust effect factor. (Sec. 26.9) = **0.85**

C_f = net force coefficient. (Fig. 29.3-1, page 301) **1.35**

A_s = B s = **323.9** ft^2

Wind Force Case B: resultant force at 0.2 B offset of the geometric center (Sec. 29.3.1)

p = Case A	=	**20**	psf
F = Case A	=	**6.36**	kips
M = Case A	=	**29.73**	ft-kips
T = 0.2 F B	=	**48.46**	ft-kips

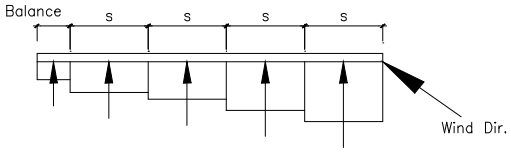
Wind Force Case C: resultant force different at each region (Sec. 29.4.1)

$p = q_h G C_f$

$F = \Sigma p A_s$

M = Σ [F (h - 0.5s) for sign, F (0.55h) for wall]

$T = \Sigma T_s$



Distance (ft)	C_f (Fig. 29.3-1)	P_i (psf)	A_{si} (ft^2)	F_i (kips)	M_i (ft-kips)	T_i (ft-kips)
8.5	2.003	29	72.25	2.11	9.84	31.16
17.0	1.559	23	72.25	1.64	7.66	10.32
25.5	1.098	16	72.25	1.15	5.39	-2.54
34.0	0.861	13	72.25	0.90	4.23	-9.68
38.1	0.861	13	34.85	0.44	2.04	-7.42
Σ				**6.24**	**29.16**	**21.84**

Project: By: TT Date:

Job #:

ASCE 7-16:

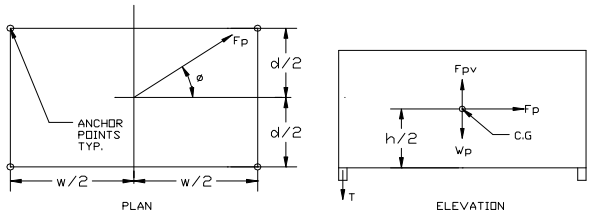
(13.3-1) $F_p = \dfrac{0.4 a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)} \left(1 + 2\dfrac{z}{h}\right)$

UNIT NAME: Wall Seismic

(13.3-3) $F_{p,\min} = 0.3 S_{DS} I_p W_p$

(13.3-2) $F_{p,\max} = 1.6 S_{DS} I_p W_p$

$$T\max = \frac{-Wt + Fpv}{4} + \frac{Fp\left(h/2\right)}{2}\left[\frac{\cos(\theta)}{w} + \frac{\sin(\theta)}{d}\right]$$



DIMENSIONS / WEIGHT:

anchor dist	WIDTH (w) - larger dim		in.	Ω =	1.0
anchor dist	DEPTH (d) - smaller dim		in.		
	HEIGHT (h)		in.		
	WEIGHT (Wp)	116	lbs.		

SEISMIC LOADS:

	a_p	2.5		R_p	2.5
	S_{DS}	1.37		z/h	0
	I_p	1.50			

wall weight in psf

(13.3-1) Fph = $\dfrac{0.4 \times 2.50 \times 1.37 \times 1.50 \times (1 + 2 \times 0.00) =}{2.50}$ =0.82 x 116 = 95

wall seismic in psf

(13.3-3) Fph (min) = 0.3 x 1.37 x 1.50 = 0.62 x 116.00 = 72

(13.3-2) Fph (max) = 1.6 x 1.37 x 1.50 = 3.29 x 116.00 = 381

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: Calcs.ec6

DESCRIPTION: Embeded HSS post in CMU wall, conservatively check post taking 100% cantilever CMU wall out-of-plan

Code References

Calculations per AISC 360-16, IBC 2018, CBC 2019, ASCE 7-16
Load Combinations Used : ASCE 7-22 / IBC 2024 (L<=100psf)

General Information

Steel Section Name : **HSS6x4x1/2**

Analysis Method :	Allowable Strength
Steel Stress Grade	
Fy : Steel Yield	46.0 ksi
E : Elastic Bending Modulus	29,000.0 ksi

Overall Column Height	12.0 ft
Top & Bottom Fixity	Top & Bottom Pinned
Brace condition :	

Unbraced Length for buckling ABOUT X-X Axis = 12.0 ft, K = 1.0
Unbraced Length for buckling ABOUT Y-Y Axis = 12.0 ft, K = 1.0

Applied Loads

Service loads entered. Load Factors will be applied for calculations.

Column self weight included : 341.160 lbs * Dead Load Factor
AXIAL LOADS . . .
Axial Load at 12.0 ft, D = 5.20, LR = 1.70 k
BENDING LOADS . . .
Lat. Uniform Load from 0.0-->8.20 ft creating My-y, E = 0.740 k/ft

DESIGN SUMMARY

Bending & Shear Check Results

PASS Max. Axial+Bending Stress Ratio = **0.3227** : 1

Load Combination	+D+0.70E
Location of max.above base	5.396 ft
At maximum location values are . . .	
Pa : Axial	5.541 k
Pn / Omega : Allowabl	116.770 k
Ma-x : Applied	0.0 k-ft
Mn-x / Omega : Allowable	33.513 k-ft
Ma-y : Applied	7.548 k-ft
Mn-y / Omega : Allowable	25.250 k-ft

PASS Maximum Shear Stress Rati **0.06984** : 1

Load Combination	+D+0.70E
Location of max.above base	0.0 ft
At maximum location values are . . .	
Va : Applied	2.796 k
Vn / Omega : Allowable	40.039 k

Maximum Load Reactions . .

Top along X-X	2.073 k
Bottom along X-X	3.995 k
Top along Y-Y	0.0 k
Bottom along Y-Y	0.0 k

Maximum Load Deflections . . .

Along Y-Y 0.0 in at 0.0 ft above base
for load combination :

Along X-X 0.5252 in at 5.879 ft above base
for load combination : E Only

Load Combination Results

Load Combination	Maximum Axial + Bending Stress Ratios: Stress Ratio	Status	Location	Cbx	Cby	KxLx/Rx	KyLy/Ry	Maximum Shear Ratios: Stress Ratio	Status	Location
D Only	0.047	PASS	0.00 ft	1.00	1.18	69.23	96.00	0.000	PASS	0.00 ft
+D+Lr	0.062	PASS	0.00 ft	1.00	1.18	69.23	96.00	0.000	PASS	0.00 ft
+D+0.750Lr	0.058	PASS	0.00 ft	1.00	1.18	69.23	96.00	0.000	PASS	0.00 ft
+0.60D	0.028	PASS	0.00 ft	1.00	1.18	69.23	96.00	0.000	PASS	0.00 ft
+D+0.70E	0.323	PASS	5.40 ft	1.00	1.18	69.23	96.00	0.070	PASS	0.00 ft
+D+0.5250E	0.248	PASS	5.40 ft	1.00	1.18	69.23	96.00	0.052	PASS	0.00 ft
+0.60D+0.70E	0.313	PASS	5.40 ft	1.00	1.18	69.23	96.00	0.070	PASS	0.00 ft

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction (k) @ Base	@ Top	Y-Y Axis Reaction (k) @ Base	@ Top	Mx - End Moments (k-ft) @ Base	@ Top	My - End Moments @ Base	@ Top
D Only	5.541								
+D+Lr	7.241								
+D+0.750Lr	6.816								
+0.60D	3.325								
+D+0.70E	5.541	-2.796	1.451						
+D+0.5250E	5.541	-2.097	1.088						
+0.60D+0.70E	3.325	-2.796	1.451						

Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: Calcs.ec6

DESCRIPTION: Embeded HSS post in CMU wall, conservatively check post taking 100% cantilever CMU wall out-of-plan

Maximum Reactions

Note: Only non-zero reactions are listed.

Load Combination	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
Lr Only	1.700										
E Only		-3.995	2.073								

Extreme Reactions

Item	Extreme Value	Axial Reaction @ Base	X-X Axis Reaction @ Base	X-X Axis Reaction @ Top	k	Y-Y Axis Reaction @ Base	Y-Y Axis Reaction @ Top	Mx - End Moments @ Base	Mx - End Moments @ Top	k-ft	My - End Moments @ Base	My - End Moments @ Top
Axial @ Base	Maximum	7.241										
"	Minimum		-3.995	2.073								
Reaction, X-X Axis Base	Maximum	5.541										
"	Minimum		-3.995	2.073								
Reaction, Y-Y Axis Base	Maximum	5.541										
"	Minimum	5.541										
Reaction, X-X Axis Top	Maximum		-3.995	2.073								
"	Minimum	5.541										
Reaction, Y-Y Axis Top	Maximum	5.541										
"	Minimum		-3.995	2.073								
Moment, X-X Axis Base	Maximum	5.541										
"	Minimum	5.541										
Moment, Y-Y Axis Base	Maximum	5.541										
"	Minimum	5.541										
Moment, X-X Axis Top	Maximum	5.541										
"	Minimum	5.541										
Moment, Y-Y Axis Top	Maximum	5.541										
"	Minimum	5.541										

Maximum Deflections for Load Combinations

Load Combination	Max. Deflection in X dir	Distance	Max. Deflection in Y dir	Distance
D Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.750Lr	0.0000 in	0.000 ft	0.000 in	0.000 ft
+0.60D	0.0000 in	0.000 ft	0.000 in	0.000 ft
+D+0.70E	0.3676 in	5.879 ft	0.000 in	0.000 ft
+D+0.5250E	0.2757 in	5.879 ft	0.000 in	0.000 ft
+0.60D+0.70E	0.3676 in	5.879 ft	0.000 in	0.000 ft
Lr Only	0.0000 in	0.000 ft	0.000 in	0.000 ft
E Only	0.5252 in	5.879 ft	0.000 in	0.000 ft

Steel Section Properties : HSS6x4x1/2

Depth	=	6.000 in	I xx	=	34.00 in^4	J	=	40.300 in^4
Design Thick	=	0.465 in	S xx	=	11.30 in^3	Cw	=	17.80 in^6
Width	=	4.000 in	R xx	=	2.080 in			
Wall Thick	=	0.500 in	Zx	=	14.600 in^3			
Area	=	7.880 in^2	I yy	=	17.800 in^4	C	=	17.800 in^3
Weight	=	28.430 plf	S yy	=	8.890 in^3			
			R yy	=	1.500 in			
			Zy	=	11.000 in^3			
Ycg	=	0.000 in						

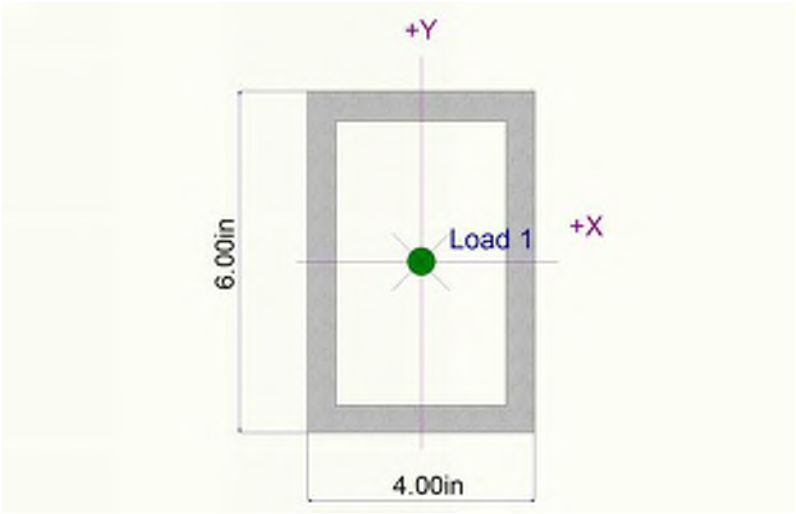
Project Title:
Engineer:
Project ID:
Project Descr:

Steel Column

Project File: Calcs.ec6

DESCRIPTION: Embeded HSS post in CMU wall, conservatively check post taking 100% cantilever CMU wall out-of-plan

Sketches



Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Calcs.ec6

DESCRIPTION: 8'-6" tall CMU wall

Code Reference

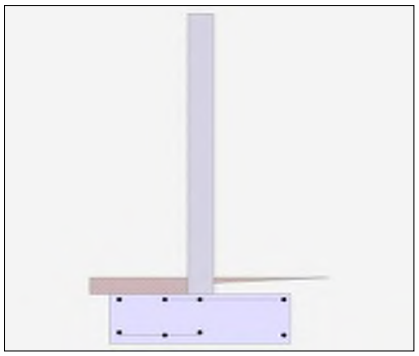
Calculations per IBC 2018 1807.3, CBC 2019, ASCE 7-16

Criteria

Retained Height	=	0.50 ft
Wall height above soil	=	8.00 ft
Slope Behind Wall	=	0.00
Height of Soil over Toe	=	6.00 in
Water table above bottom of footing	=	0.0 ft

Soil Data

Allow Soil Bearing	=	1,500.0 psf
Equivalent Fluid Pressure Method		
Active Heel Pressure	=	1.0 psf/ft
	=	
Passive Pressure	=	250.0 psf/ft
Soil Density, Heel	=	110.00 pcf
Soil Density, Toe	=	110.00 pcf
Footing||Soil Friction	=	0.400
Soil height to ignore for passive pressure	=	12.00 in



Surcharge Loads

Surcharge Over Heel	=	0.0 psf
Used To Resist Sliding & Overturning		
Surcharge Over Toe	=	0.0
Used for Sliding & Overturning		

Axial Load Applied to Stem

Axial Dead Load	=	194.0 lbs
Axial Live Load	=	0.0 lbs
Axial Load Eccentricity	=	0.0 in

Lateral Load Applied to Stem

Lateral Load	=	63.3 #/ft
...Height to Top	=	8.50 ft
...Height to Bottom	=	0.50 ft
Load Type	=	Seismic (E) (Strength Level)
Wind on Exposed Stem (Strength Level)	=	0.0 psf

Adjacent Footing Load

Adjacent Footing Load	=	0.0 lbs
Footing Width	=	0.00 ft
Eccentricity	=	0.00 in
Wall to Ftg CL Dist	=	0.00 ft
Footing Type		Spread Footing
Base Above/Below Soil at Back of Wall	=	0.0 ft
Poisson's Ratio	=	0.300

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Calcs.ec6

DESCRIPTION: 8'-6" tall CMU wall

Design Summary

Wall Stability Ratios

Overturning	=	1.59	OK
Sliding	=	2.68	OK
Global Stability	=	54.41	

Total Bearing Load	=	1,457 lbs	
...resultant ecc.	=	17.53 in	
Eccentricity outside middle third			
Soil Pressure @ Toe	=	1,132 psf	OK
Soil Pressure @ Heel	=	0 psf	OK
Allowable	=	1,500 psf	
Soil Pressure Less Than Allowable			
ACI Factored @ Toe	=	1,585 psf	
ACI Factored @ Heel	=	0 psf	
Footing Shear @ Toe	=	7.0 psi	OK
Footing Shear @ Heel	=	3.6 psi	OK
Allowable	=	82.2 psi	

Sliding Calcs

Lateral Sliding Force	=	356.5 lbs	
less 100% Passive Force	-	375.0 lbs	
less 100% Friction Force	-	582.1 lbs	
Added Force Req'd	=	0.0 lbs	OK
....for 1.5 Stability	=	0.0 lbs	OK

Vertical component of active lateral soil pressure IS NOT considered in the calculation of soil bearing

Load Factors

Building Code	
Dead Load	1.200
Live Load	1.600
Earth, H	1.600
Wind, W	1.600
Seismic, E	1.000

Stem Construction

		Bottom		
		Stem OK		
Design Height Above Ftg	ft =	0.00		
Wall Material Above "Ht"	=	Masonry		
Design Method	=	ASD	SD	SD
Thickness	=	8.00		
Rebar Size	=	# 6		
Rebar Spacing	=	8.00		
Rebar Placed at	=	Center		
Design Data				
fb/FB + fa/Fa	=	**0.658**		
Total Force @ Section				
Service Level	lbs =	354.6		
Strength Level	lbs =			
Moment....Actual				
Service Level	ft-# =	1,595.2		
Strength Level	ft-# =			
Moment.....Allowable	=	2,574.1		
Shear.....Actual				
Service Level	psi =	3.9		
Strength Level	psi =			
Shear.....Allowable	psi =	49.7		
Anet (Masonry)	in2 =	91.50		
Wall Weight	psf =	0.0		
Rebar Depth 'd'	in =	3.81		

Masonry Data

f'm	psi =	1,900
Fs	psi =	20,000
Solid Grouting	=	Yes
Modular Ratio 'n'	=	16.96
Equiv. Solid Thick.	in =	7.63
Masonry Block Type	=	
Masonry Design Method	=	ASD

Concrete Data

f'c	psi =	
Fy	psi =	

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Calcs.ec6

DESCRIPTION: 8'-6" tall CMU wall

Footing Data

Toe Width	=	2.00 ft
Heel Width	=	2.64
Total Footing Width	=	4.64
Footing Thickness	=	18.00 in

f'c = 3,000 psi Fy = 60,000 psi
Footing Concrete Density = 150.00 pcf
Min. As % = 0.0018
Cover @ Top 2.00 @ Btm.= 3.00 in

Footing Design Results

		Toe	Heel	
Factored Pressure	=	1,585	0	psf
Mu' : Upward	=	2,348	0	ft-#
Mu' : Downward	=	784	761	ft-#
Mu: Design	=	1,564	761	ft-#
φ Mn	=	28,103	30,083	ft-#
Actual 1-Way Shear	=	7.02	3.56	psi
Allow 1-Way Shear	=	82.16	82.16	psi

Toe Reinforcing = # 6 @ 12.00 in
Heel Reinforcing = # 6 @ 12.00 in
Key Reinforcing = None Spec'd
Footing Torsion, Tu = 0.00 ft-lbs
Footing Allow. Torsion, φ Tn = 0.00 ft-lbs

If torsion exceeds allowable, provide supplemental design for footing torsion.

Other Acceptable Sizes & Spacings

Toe: #4@ 6.17 in, #5@ 9.56 in, #6@ 13.58 in, #7@ 18.51 in, #8@ 24.38 in, #9@ 30.86 in, #10@ 39.19 in

Heel: #4@ 6.17 in, #5@ 9.56 in, #6@ 13.58 in, #7@ 18.51 in, #8@ 24.38 in, #9@ 30.86 in, #10@ 39.19 in

Key: No key defined

Min footing T&S reinf Area 1.80 in2
Min footing T&S reinf Area per foot 0.39 in2 /ft

If one layer of horizontal bars:	If two layers of horizontal bars:
#4@ 6.17 in	#4@ 12.35 in
#5@ 9.57 in	#5@ 19.14 in
#6@ 13.58 in	#6@ 27.16 in

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Calcs.ec6

DESCRIPTION: 8'-6" tall CMU wall

Summary of Overturning & Resisting Forces & Moments

Item	.....OVERTURNING..... Force lbs	Distance ft	Moment ft-#	.....RESISTING..... Force lbs	Distance ft	Moment ft-#
HL Act Pres (ab water tbl)	2.0	0.67	1.3			
HL Act Pres (be water tbl)						
Hydrostatic Force						
Buoyant Force =						
Surcharge over Heel =						
Surcharge Over Toe =						
Adjacent Footing Load =						
Added Lateral Load =	354.5	6.00	2,126.9			
Load @ Stem Above Soil =						
=						
				Soil Over HL (ab. water tbl)	108.3	3.65	395.2
				Soil Over HL (bel. water tbl)		3.65	395.2
				Water Table			
				Sloped Soil Over Heel =			
				Surcharge Over Heel =			
				Adjacent Footing Load =			
				Axial Dead Load on Stem =	194.0	2.33	452.7
				* Axial Live Load on Stem =			
				Soil Over Toe =	110.0	1.00	110.0
				Surcharge Over Toe =			
				Stem Weight(s) =			
				Earth @ Stem Transitions =			
				Footing Weight =	1,042.9	2.32	2,416.9
				Key Weight =			
				Vert. Component =			
Total =	356.5	**O.T.M.** =	2,128.2	**Total =**	1,455.1 lbs	**R.M.=**	3,374.8

Resisting/Overturning Ratio = **1.59**
Vertical Loads used for Soil Pressure = 1,457.2 lbs

* Axial live load NOT included in total displayed, or used for overturning resistance, but is included for soil pressure calculation.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Sliding Resistance.

Vertical component of active lateral soil pressure IS NOT considered in the calculation of Overturning Resistance.

Tilt

Horizontal Deflection at Top of Wall due to settlement of soil

(Deflection due to wall bending not considered)

Soil Spring Reaction Modulus	250.0	pci
Horizontal Defl @ Top of Wall (approximate only)	0.058	in

The above calculation is not valid if the heel soil bearing pressure exceeds that of the toe, because the wall would then tend to rotate into the retained soil.

Project Title:
Engineer:
Project ID:
Project Descr:

DESCRIPTION: 8'-6" tall CMU wall

Rebar Lap & Embedment Lengths Information

Stem Design Segment: Bottom
Stem Design Height: 0.00 ft above top of footing
Calculated Rebar Stress, fs = 9115.79 psi

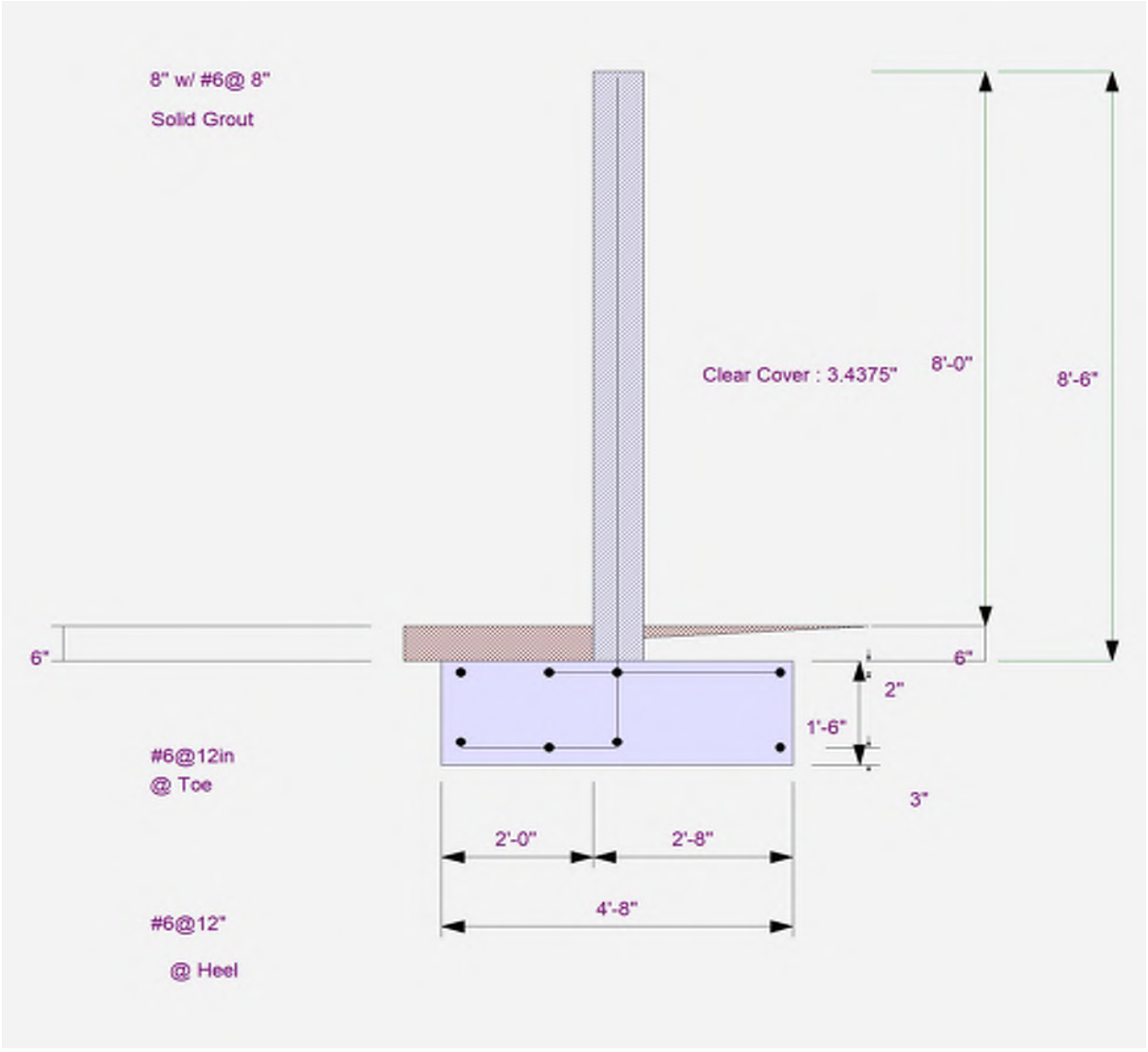
Lap Splice length for #6 bar specified in this stem design segment (25.4.2.3a) =	30.00 in
Development length for #6 bar specified in this stem design segment =	13.67 in
Hooked embedment length into footing for #6 bar specified in this stem design segment =	7.67 in
As Provided =	0.6600 in2/ft
As Required =	0.2859 in2/ft

Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Calcs.ec6

DESCRIPTION: 8'-6" tall CMU wall

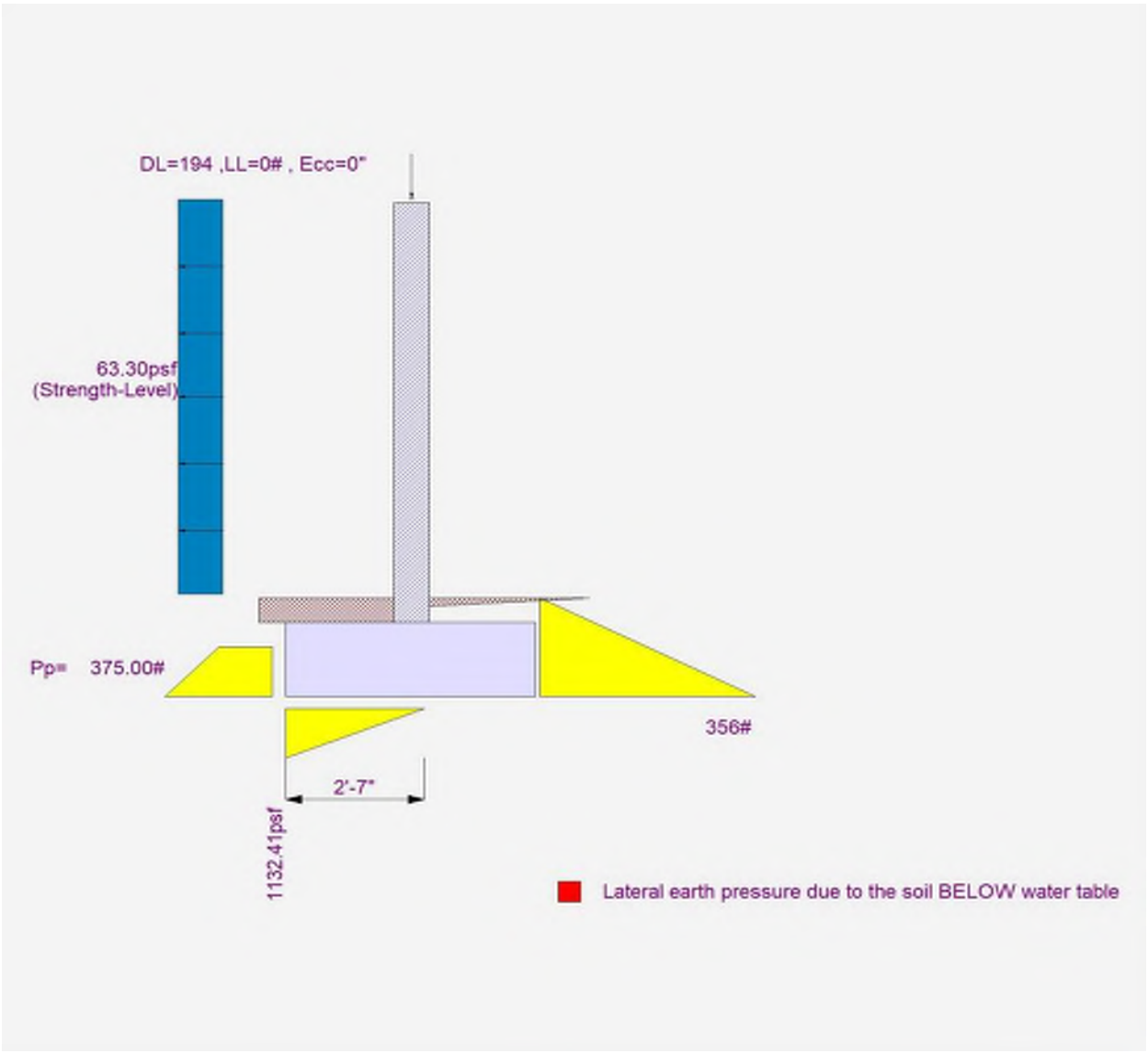


Project Title:
Engineer:
Project ID:
Project Descr:

Cantilevered Retaining Wall

Project File: Calcs.ec6

DESCRIPTION: 8'-6" tall CMU wall



5. W-Beams to (E) or (N) Concrete Column Connections

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Company:	Wheeler and Gray	Page:	1
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

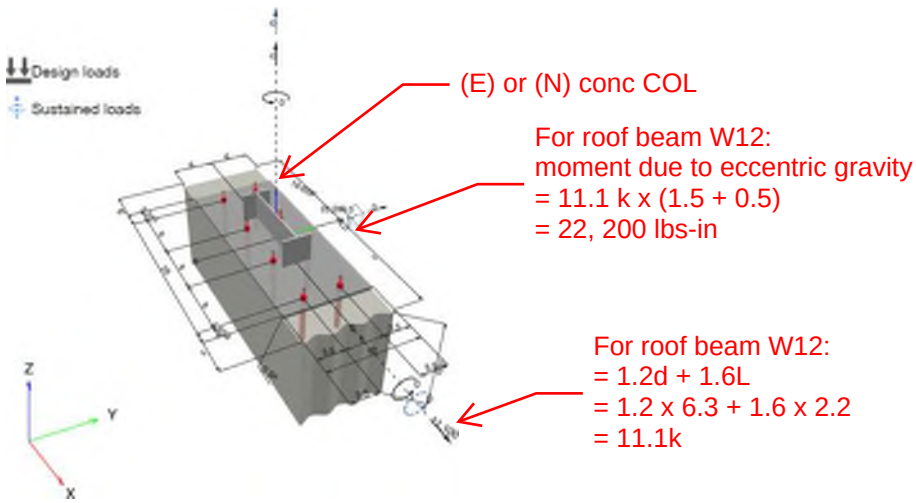
Specifier's comments:

1 Input data

Anchor type and diameter:	**HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4**
Item number:	2198029 HAS-V-36 3/4"x8" (element) / 2334276 HIT-HY 200-R V3 (adhesive)
Specification text:	Hilti HAS threaded rod with HIT-HY 200 V3 injection mortar with 6 in embedment hef, 3/4, Carbon steel, Safe Set System, Hammer drilled installation per ESR-4868
Effective embedment depth:	$h_{ef,act}$ = 6.000 in. ($h_{ef,limit}$ = - in.) (use 10" embed for extra capacity)
Material:	ASTM F1554 Grade 36
Evaluation Service Report:	ESR-4868
Issued I Valid:	11/1/2022 | 11/1/2024
Proof:	Design Method ACI 318-19 / Chem
Stand-off installation:	e_b = 0.000 in. (no stand-off); t = 0.500 in.
Anchor plate[R] :	l_x x l_y x t = 28.000 in. x 12.000 in. x 0.500 in.; (Recommended plate thickness: not calculated)
Profile:	W shape (AISC), W12X14; (L x W x T x FT) = 11.900 in. x 3.970 in. x 0.200 in. x 0.225 in.
Base material:	cracked concrete, 2500, f_c' = 2,500 psi; h = 420.000 in., Temp. short/long: 32/32 °F
Installation:	**hammer drilled hole, Installation condition: Dry**
Reinforcement:	tension: not present, shear: not present; no supplemental splitting reinforcement present edge reinforcement: none or < No. 4 bar

[R] - The anchor calculation is based on a rigid anchor plate assumption.

Geometry [in.] & Loading [lb, in.lb]



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Company:	Wheeler and Gray	Page:	2
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

1.1 Design results

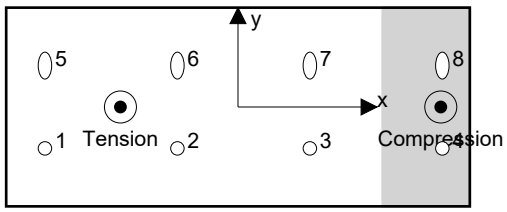
Case	Description	Forces [lb] / Moments [in.lb]	Seismic	Max. Util. Anchor [%]
1	Combination 1	N = 0; V_x = 11,100; V_y = 0; M_x = 0; M_y = 22,200; M_z = 0;	no	82

2 Load case/Resulting anchor forces

Anchor reactions [lb]

Tension force: (+Tension, -Compression)

Anchor	Tension force	Shear force	Shear force x	Shear force y
1	315	1,387	1,387	0
2	191	1,387	1,387	0
3	68	1,387	1,387	0
4	0	1,387	1,387	0
5	315	1,387	1,387	0
6	191	1,387	1,387	0
7	68	1,387	1,387	0
8	0	1,387	1,387	0



max. concrete compressive strain: 0.01 [‰]
max. concrete compressive stress: 36 [psi]
resulting tension force in (x/y)=(-7.100/0.000): 1,147 [lb]
resulting compression force in (x/y)=(12.247/0.000): 1,147 [lb]

Anchor forces are calculated based on the assumption of a rigid anchor plate.

3 Tension load

	Load N_{ua} [lb]	Capacity ϕ N_n [lb]	Utilization $\beta_N = N_{ua}/\phi$ N_n	Status
Steel Strength*	315	14,550	3	OK
Bond Strength**	1,147	6,446	18	OK
Sustained Tension Load Bond Strength*	N/A	N/A	N/A	N/A
Concrete Breakout Failure**	1,147	5,933	20	OK

* highest loaded anchor **anchor group (anchors in tension)

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Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

3.1 Steel Strength

N_{sa} = ESR value — refer to ICC-ES ESR-4868
$\phi\ N_{sa} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

Variables

$A_{se,N}$ [in.^{2}]	f_{uta} [psi]
0.33	58,000

Calculations

N_{sa} [lb]
19,400

Results

N_{sa} [lb]	ϕ_{steel}	$\phi\ N_{sa}$ [lb]	N_{ua} [lb]
19,400	0.750	14,550	315

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Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

3.2 Bond Strength

$N_{ag} = \left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ec1,Na}\ \psi_{ec2,Na}\ \psi_{ed,Na}\ \psi_{cp,Na}\ N_{ba}$ — ACI 318-19 Eq. (17.6.5.1b)

$\phi\ N_{ag} \geq N_{ua}$ — ACI 318-19 Table 17.5.2

A_{Na} see ACI 318-19, Section 17.6.5.1, Fig. R 17.6.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ — ACI 318-19 Eq. (17.6.5.1.2a)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ — ACI 318-19 Eq. (17.6.5.1.2b)

$\psi_{ec,Na} = \left(\frac{1}{1 + \frac{e'_N}{c_{Na}}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.5.3.1)

$\psi_{ed,Na} = 0.7 + 0.3 \left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.5.4.1b)

$\psi_{cp,Na} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.6.5.5.1b)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ — ACI 318-19 Eq. (17.6.5.2.1)

Variables

$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\alpha_{overhead}$	$\tau_{k,c}$ [psi]
2,220	0.750	6.000	3.500	1.000	1,260

$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
3.441	0.000	8.648	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
10.607	415.28	450.00	0.799

$\psi_{ec1,Na}$	$\psi_{ec2,Na}$	$\psi_{cp,Na}$	N_{ba} [lb]
0.755	1.000	1.000	17,813

Results

N_{ag} [lb]	ϕ_{bond}	$\phi\ N_{ag}$ [lb]	N_{ua} [lb]
9,917	0.650	6,446	1,147

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Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

3.3 Concrete Breakout Failure

$N_{cbg} = \left(\frac{A_{Nc}}{A_{Nc0}}\right) \psi_{ec,N}\ \psi_{ed,N}\ \psi_{c,N}\ \psi_{cp,N}\ N_b$ ACI 318-19 Eq. (17.6.2.1b)

$\phi\ N_{cbg} \geq N_{ua}$ ACI 318-19 Table 17.5.2

A_{Nc} see ACI 318-19, Section 17.6.2.1, Fig. R 17.6.2.1(b)

$A_{Nc0} = 9\ h_{ef}^2$ ACI 318-19 Eq. (17.6.2.1.4)

$\psi_{ec,N} = \left(\frac{1}{1 + \frac{2\ e'_N}{3\ h_{ef}}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.3.1)

$\psi_{ed,N} = 0.7 + 0.3\left(\frac{c_{a,min}}{1.5h_{ef}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.4.1b)

$\psi_{cp,N} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{1.5h_{ef}}{c_{ac}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.2.6.1b)

$N_b = k_c\ \lambda_a\ \sqrt{f'_c}\ h_{ef}^{1.5}$ ACI 318-19 Eq. (17.6.2.2.1)

Variables

h_{ef} [in.]	$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	$c_{a,min}$ [in.]	$\psi_{c,N}$
5.333	3.441	0.000	3.500	1.000

c_{ac} [in.]	k_c	λ_a	f'_c [psi]
8.648	17	1.000	2,500

Calculations

A_{Nc} [in.^{2}]	A_{Nc0} [in.^{2}]	$\psi_{ec1,N}$	$\psi_{ec2,N}$	$\psi_{ed,N}$	$\psi_{cp,N}$	N_b [lb]
384.00	256.00	0.699	1.000	0.831	1.000	10,469

Results

N_{cbg} [lb]	$\phi_{concrete}$	$\phi\ N_{cbg}$ [lb]	N_{ua} [lb]
9,128	0.650	5,933	1,147

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Company:	Wheeler and Gray	Page:	6
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

4 Shear load

	Load V_{ua} [lb]	Capacity ϕ V_n [lb]	Utilization $\beta_V = V_{ua}/\phi$ V_n	Status
Steel Strength*	1,387	7,566	19	OK
Steel failure (with lever arm)*	N/A	N/A	N/A	N/A
Pryout Strength (Bond Strength controls)**	11,100	22,639	50	OK
Concrete edge failure in direction y-**	11,100	13,554	82	OK

* highest loaded anchor **anchor group (relevant anchors)

4.1 Steel Strength

V_{sa} = ESR value refer to ICC-ES ESR-4868
ϕ $V_{steel} \geq V_{ua}$ ACI 318-19 Table 17.5.2

Variables

$A_{se,V}$ [in.^{2}]	f_{uta} [psi]
0.33	58,000

Calculations

V_{sa} [lb]
11,640

Results

V_{sa} [lb]	ϕ_{steel}	ϕ V_{sa} [lb]	V_{ua} [lb]
11,640	0.650	7,566	1,387

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Company:	Wheeler and Gray	Page:	7
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

4.2 Pryout Strength (Bond Strength controls)

$V_{cpg} = k_{cp}\left[\left(\frac{A_{Na}}{A_{Na0}}\right) \psi_{ec1,Na}\ \psi_{ec2,Na}\ \psi_{ed,Na}\ \psi_{cp,Na}\ N_{ba}\right]$ ACI 318-19 Eq. (17.7.3.1b)

$\phi\ V_{cpg} \geq V_{ua}$ ACI 318-19 Table 17.5.2

A_{Na} see ACI 318-19, Section 17.6.5.1, Fig. R 17.6.5.1(b)

$A_{Na0} = (2\ c_{Na})^2$ ACI 318-19 Eq. (17.6.5.1.2a)

$c_{Na} = 10\ d_a \sqrt{\frac{\tau_{uncr}}{1100}}$ ACI 318-19 Eq. (17.6.5.1.2b)

$\psi_{ec,Na} = \left(\frac{1}{1 + \frac{e'_N}{c_{Na}}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.5.3.1)

$\psi_{ed,Na} = 0.7 + 0.3\left(\frac{c_{a,min}}{c_{Na}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.5.4.1b)

$\psi_{cp,Na} = \text{MAX}\left(\frac{c_{a,min}}{c_{ac}}, \frac{c_{Na}}{c_{ac}}\right) \leq 1.0$ ACI 318-19 Eq. (17.6.5.5.1b)

$N_{ba} = \lambda_a \cdot \tau_{k,c} \cdot \pi \cdot d_a \cdot h_{ef}$ ACI 318-19 Eq. (17.6.5.2.1)

Variables

k_{cp}	$\alpha_{overhead}$	$\tau_{k,c,uncr}$ [psi]	d_a [in.]	h_{ef} [in.]	$c_{a,min}$ [in.]	$\tau_{k,c}$ [psi]
2	1.000	2,220	0.750	6.000	3.500	1,260

$e_{c1,N}$ [in.]	$e_{c2,N}$ [in.]	c_{ac} [in.]	λ_a
0.000	0.000	8.648	1.000

Calculations

c_{Na} [in.]	A_{Na} [in.^{2}]	A_{Na0} [in.^{2}]	$\psi_{ed,Na}$
10.607	511.28	450.00	0.799

$\psi_{ec1,Na}$	$\psi_{ec2,Na}$	$\psi_{cp,Na}$	N_{ba} [lb]
1.000	1.000	1.000	17,813

Results

V_{cpg} [lb]	$\phi_{concrete}$	$\phi\ V_{cpg}$ [lb]	V_{ua} [lb]
32,341	0.700	22,639	11,100

Hilti PROFIS Engineering 3.1.2

www.hilti.com

Company:	Wheeler and Gray	Page:	8
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

4.3 Concrete edge failure in direction y-

$V_{cbg} = \left(\frac{A_{Vc}}{A_{Vc0}}\right) \psi_{ec,V}\ \psi_{ed,V}\ \psi_{c,V}\ \psi_{h,V}\ \psi_{parallel,V}\ V_b$ — ACI 318-19 Eq. (17.7.2.1b)

$\phi\ V_{cbg} \geq V_{ua}$ — ACI 318-19 Table 17.5.2

A_{Vc} see ACI 318-19, Section 17.7.2.1, Fig. R 17.7.2.1(b)

$A_{Vc0} = 4.5\ c_{a1}^2$ — ACI 318-19 Eq. (17.7.2.1.3)

$\psi_{ec,V} = \left(\frac{1}{1 + \frac{e_v'}{1.5c_{a1}}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.7.2.3.1)

$\psi_{ed,V} = 0.7 + 0.3\left(\frac{c_{a2}}{1.5c_{a1}}\right) \leq 1.0$ — ACI 318-19 Eq. (17.7.2.4.1b)

$\psi_{h,V} = \sqrt{\frac{1.5c_{a1}}{h_a}} \geq 1.0$ — ACI 318-19 Eq. (17.7.2.6.1)

$V_b = 9\ \lambda_a\ \sqrt{f_c'}\ c_{a1}^{1.5}$ — ACI 318-19 Eq. (17.7.2.2.1b)

Variables

c_{a1} [in.]	c_{a2} [in.]	e_{cV} [in.]	$\psi_{c,V}$	h_a [in.]
3.500	8.000	0.000	1.000	420.000

l_e [in.]	λ_a	d_a [in.]	f_c' [psi]	$\psi_{parallel,V}$
6.000	1.000	0.750	2,500	2.000

Calculations

A_{Vc} [in.^{2}]	A_{Vc0} [in.^{2}]	$\psi_{ec,V}$	$\psi_{ed,V}$	$\psi_{h,V}$	V_b [lb]
181.13	55.12	1.000	1.000	1.000	2,947

Results

V_{cbg} [lb]	$\phi_{concrete}$	$\phi\ V_{cbg}$ [lb]	V_{ua} [lb]
19,363	0.700	13,554	11,100

5 Combined tension and shear loads, per ACI 318-19 section 17.8

β_N	β_V	ζ	Utilization $\beta_{N,V}$ [%]	Status
0.193	0.819	5/3	79	OK

$\beta_{NV} = \beta_N^{\zeta} + \beta_V^{\zeta} <= 1$

Company:	Wheeler and Gray	Page:	9
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

6 Warnings

- The anchor design methods in PROFIS Engineering require rigid anchor plates per current regulations (AS 5216:2021, ETAG 001/Annex C, EOTA TR029 etc.). This means load re-distribution on the anchors due to elastic deformations of the anchor plate are not considered - the anchor plate is assumed to be sufficiently stiff, in order not to be deformed when subjected to the design loading. PROFIS Engineering calculates the minimum required anchor plate thickness with CBFEM to limit the stress of the anchor plate based on the assumptions explained above. The proof if the rigid anchor plate assumption is valid is not carried out by PROFIS Engineering. Input data and results must be checked for agreement with the existing conditions and for plausibility!
- Condition A applies where the potential concrete failure surfaces are crossed by supplementary reinforcement proportioned to tie the potential concrete failure prism into the structural member. Condition B applies where such supplementary reinforcement is not provided, or where pullout or pryout strength governs.
- Design Strengths of adhesive anchor systems are influenced by the cleaning method. Refer to the INSTRUCTIONS FOR USE given in the Evaluation Service Report for cleaning and installation instructions.
- For additional information about ACI 318 strength design provisions, please go to https://submittals.us.hilti.com/PROFISAnchorDesignGuide/
- Installation of Hilti adhesive anchor systems shall be performed by personnel trained to install Hilti adhesive anchors. Reference ACI 318-19, Section 26.7.

Fastening meets the design criteria!

Hilti PROFIS Engineering 3.1.2

www.hilti.com

Company:	Wheeler and Gray	Page:	10
Address:		Specifier:	Ken Agee
Phone I Fax:	|	E-Mail:	kagee@wheelerandgray.com
Design:	Concrete - Sep 7, 2024	Date:	9/8/2024
Fastening point:			

7 Installation data

Profile: W shape (AISC), W12X14; (L x W x T x FT) = 11.900 in. x 3.970 in. x 0.200 in. x 0.225 in.

Hole diameter in the fixture: d_f = 0.812 in.

Plate thickness (input): 0.500 in.

Recommended plate thickness: not calculated

Drilling method: Hammer drilled

Cleaning: Compressed air cleaning of the drilled hole according to instructions for use is required

Anchor type and diameter: HIT-HY 200 V3 + HAS-V-36 (ASTM F1554 Gr.36) 3/4

Item number: 2198029 HAS-V-36 3/4"x8" (element) / 2334276 HIT-HY 200-R V3 (adhesive)

Maximum installation torque: 1,200 in.lb

Hole diameter in the base material: 0.875 in.

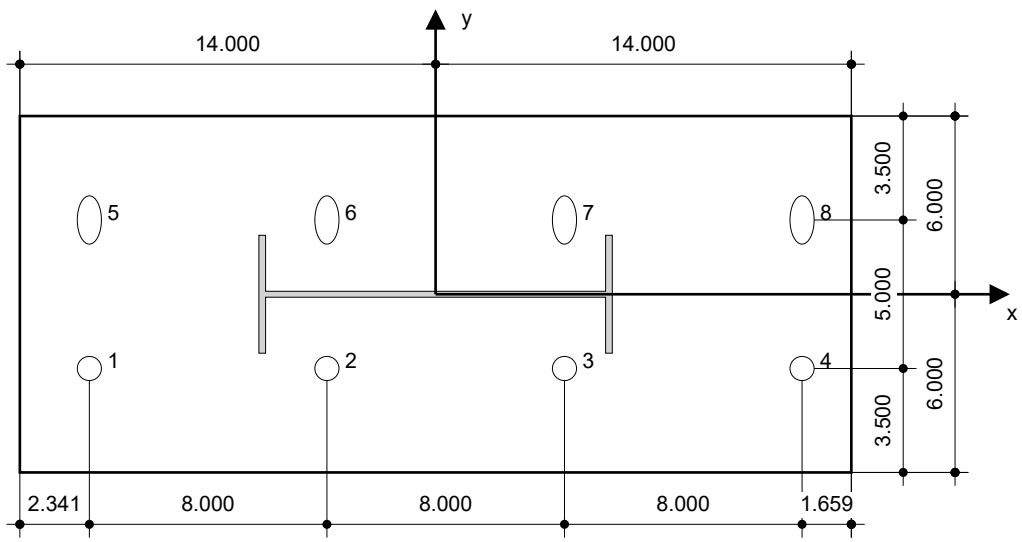
Hole depth in the base material: 6.000 in.

Minimum thickness of the base material: 7.750 in.

Hilti HAS threaded rod with HIT-HY 200 V3 injection mortar with 6 in embedment hef, 3/4, Carbon steel, Safe Set System, Hammer drilled installation per ESR-4868

7.1 Recommended accessories

Drilling	Cleaning	Setting
• Suitable Rotary Hammer • Properly sized drill bit	• Compressed air with required accessories to blow from the bottom of the hole • Proper diameter wire brush	• Dispenser including cassette and mixer • Torque wrench



Coordinates Anchor [in.]

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
1	-11.659	-2.500	8.000	-	3.500	8.500
2	-3.659	-2.500	16.000	-	3.500	8.500
3	4.341	-2.500	24.000	-	3.500	8.500
4	12.341	-2.500	32.000	-	3.500	8.500

Anchor	x	y	c_{-x}	c_{+x}	c_{-y}	c_{+y}
5	-11.659	2.500	8.000	-	8.500	3.500
6	-3.659	2.500	16.000	-	8.500	3.500
7	4.341	2.500	24.000	-	8.500	3.500
8	12.341	2.500	32.000	-	8.500	3.500

E. HISTORIC REFERENCE MATERIALS

- Original 1973 Drawings

CLAREMONT POLICE FACILITY BUILDING

THEODORE CRILEY JR. A.I.A. & FRED W. McDOWELL A.I.A.
ASSOCIATED ARCHITECTS
MARION J. VARNER & ASSOCIATES CONSULTING ARCHITECTS
THOMAS H. PARRY & ASSOCIATES : MECHANICAL ENGINEER
FRED ASHTON CONSULTING ENGINEER
WILLIAM H. KING ELECTRICAL ENGINEER

MARION VARNER
213-681-2441
213 796-8116
RUS HOBBS: HOME 213-335 8167

LEGEND

PLOT PLAN

- EXTERIOR CONCRETE PAVING, GUTTER
- ASPHALTIC CONCRETE PAVING
- MASONRY GARDEN WALL
- 193 GRADE ELEVATION
- 1% SLOPE
- 71 FINISH CONTOUR
- -x-x- CHAIN LINK FENCE
- 60.38' ELEVATION

GENERAL

- 3/9 INDICATES DETAIL NUMBER / INDICATES SHEET NUMBER
- (A) SASH SYMBOL
- (4) DOOR SYMBOL
- 101 ROOM SYMBOL
- Ø ROUND
- ∠ ANGLE
- [CHANNEL
- ℄ CENTER LINE

PLAN

- CONCRETE MASONRY WALL
- CONCRETE WALL
- STUD & PLASTER WALL

SECTION

- CONCRETE MASONRY
- CONCRETE
- TILE, TERRAZZO, TERRA COTTA
- INSULATION
- PLYWOOD

ELEVATION

- CONCRETE
- PLASTER OR DRY WALL
- MASONRY

ABBREVIATIONS

A.C.	ASPHALTIC CONCRETE
AC.	ACOUSTIC
ADJ.	ADJUSTABLE
APPROX.	APPROXIMATE
ASPH.	ASPHALTIC
ALUM.	ALUMINUM
BD.	BOARD
BLDG.	BUILDING
BOTT.	BOTTOM
BRKT.	BRACKET
BSMT	BASEMENT
BRZ.	BRONZE
B.W.	BOTH WAYS
BM.	BEAM
CAB.	CABINET
C.B.	CORNER BEAD
CEM.	CEMENT
CEMPLAS	CEMENT PLASTER
C.F.	CURB FACE
CLG.	CEILING
CER.	CERAMIC
CLOS.	CLOSET
COL.	COLUMN
CONC.	CONCRETE
CONT.	CONTINUOUS
CONTR.	CONTRACTOR
CTR.	COUNTER
CL.	CLEAR
D.D.	DOOR DIMENSION
DET.	DETAIL
D.F.	DRINKING FOUNTAIN
D.F.	DOUGLAS FIR
DIA.	DIAMETER
DO.	DITTO
DORM.	DORMITORY
DN.	DOWN
DR.	DOOR
DRWR.	DRAWER
DSB	DOUBLE STRENGTH 'B' GLASS
D.S.	DOWNSPOUT
E	EAST
EA.	EACH
EL ELEV.	ELEVATION
E.F.L.	EXISTING FLOW LINE
ELECT.	ELECTRICAL
E.J.	EXPANSION JOINT
EQ.	EQUAL
E.T.C.	EXISTING TOP OF CURB ELEV.
EXIST'G	EXISTING
EXP.	EXPANSION
F.D.	FLOOR DRAIN
F.F.E.	FIRST FLOOR ELEVATION
F.G.	FINISH GRADE
FIN.	FINISH
F.H.M.S.	FLAT HEAD MACHINE SCREW
F.H.W.S.	FLAT HEAD WOOD SCREW
FL FLR.	FLOOR
F.L.	FLOW LINE
F.H.C.	FIRE HOSE CABINET
FURR.	FURRING
FF.EL.	FLOOR PIPE TUNNEL ELEVATION
F.S.	FINISH SURFACE ELEVATION
GALV.	GALVANIZED
GA.	GAUGE
G.I.	GALVANIZED IRON
GL.	GLASS
GRD.	GRADE
GYP.	GYPSUM
H.M.	HOLLOW METAL
HORIZ.	HORIZONTAL
H.R.	HAND RAIL
HT.	HEIGHT
I.D.	INTERIOR DIAMETER
INT.	INTERIOR
JAN.	JANITOR
K.C.P.	KEENE CEMENT PLASTER
LAM.	LAMINATE
LAV.	LAVATORY
LG.	LONG
LT.	LIGHT
L.T.	LAUNDRY TRAY
M.O.	MASONRY OPENING
MAT'L.	MATERIAL
MAX.	MAXIMUM
M.C.	MEDICINE CABINET
MECH.	MECHANICAL
MECH EQUIP.	MECHANICAL EQUIPMENT
MIN.	MINIMUM
MLD.	MOULD
M.O.	MASONRY OPENING
M.T.	METAL TRIM
MTL.	METAL
M THRSH.	METAL THRESHOLD
MULL.	MULLION
N.	NORTH
NAT.	NATURAL
N.G.	NATURAL GRADE
N.I.C.	NOT IN CONTRACT
OBSC.	OBSCURE
O.C.	ON CENTER
OPNG.	OPENING
OZ.	OUNCE
PARTN.	PARTITION
PL.	PLATE
PLAS. LAM.	PLASTIC LAMINATE
PLAS.	PLASTER
PLY. PLYWD.	PLYWOOD
POL.	POLISH
POL. PL.	POLISH PLATE
PROP.	PROPERTY
PS.	PLANT SPACE
P.H.	PAPER HOLDER
P.T.D.	PAPER TOWEL DISPENSER
R.	RADIUS, RISER
R.A.	RETURN AIR
R.E.	ROUND EDGE
REQ'D REQ'S	REQUIRED
R.H.M.S.	ROUND HEAD MACHINE SCREW
R.H.W.S.	ROUND HEAD WOOD SCREW
RM.	ROOM
R.W.	REDWOOD
S.	SOUTH
S.S.	STAINLESS STEEL
SCHED.	SCHEDULE
S.C.	SOLID CORE
S.D.	SASH DIMENSION
SEC.	SECTION
SERV.	SERVICE
SHF. SHVS.	SHELF, SHELVES
SHT.	SHEET
SIM.	SIMILAR
SL.	SLIDING
SPECS	SPECIFICATIONS
SQ.	SQUARE
STOR.	STORAGE
STRUCT.	STRUCTURAL
T.C.	TOP OF CURB ELEV., TERRA COTTA
TERR.	TERRAZZO
T.&G.	TONGUE & GROOVE
THRESH.	THRESHOLD
TR.	TREAD
T.S.C.	TOP OF STONE CURB ELEVATION
T.W.	TOP OF WALL ELEVATION
TYP.	TYPICAL
T.B.	TOWEL BAR
VERT.	VERTICAL
V.F.	VINYL FABRIC
V.T.R.	VENT THRU ROOF
V.A.	VINYL ASBESTOS
W.	WEST
WD.	WOOD
W/	WITH
WARD.	WARDROBE
W.H.	WATER HEATER
WNSCT.	WAINSCOT
W.M.	WATER MAIN

SHEET INDEX

ARCHITECTURAL

JAIL

STRUCTURAL

ELECTRICAL

MECHANICAL

PLUMBING

T-1

S.C. = $\frac{3}{4}$ 3.00 / MO

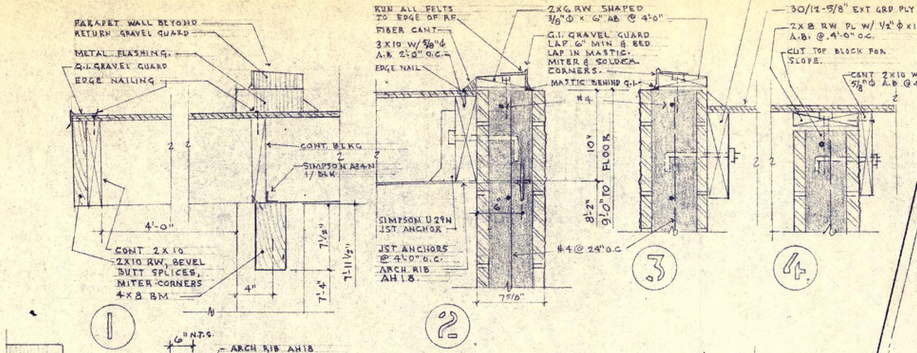
104 / THERM
84 / THERM

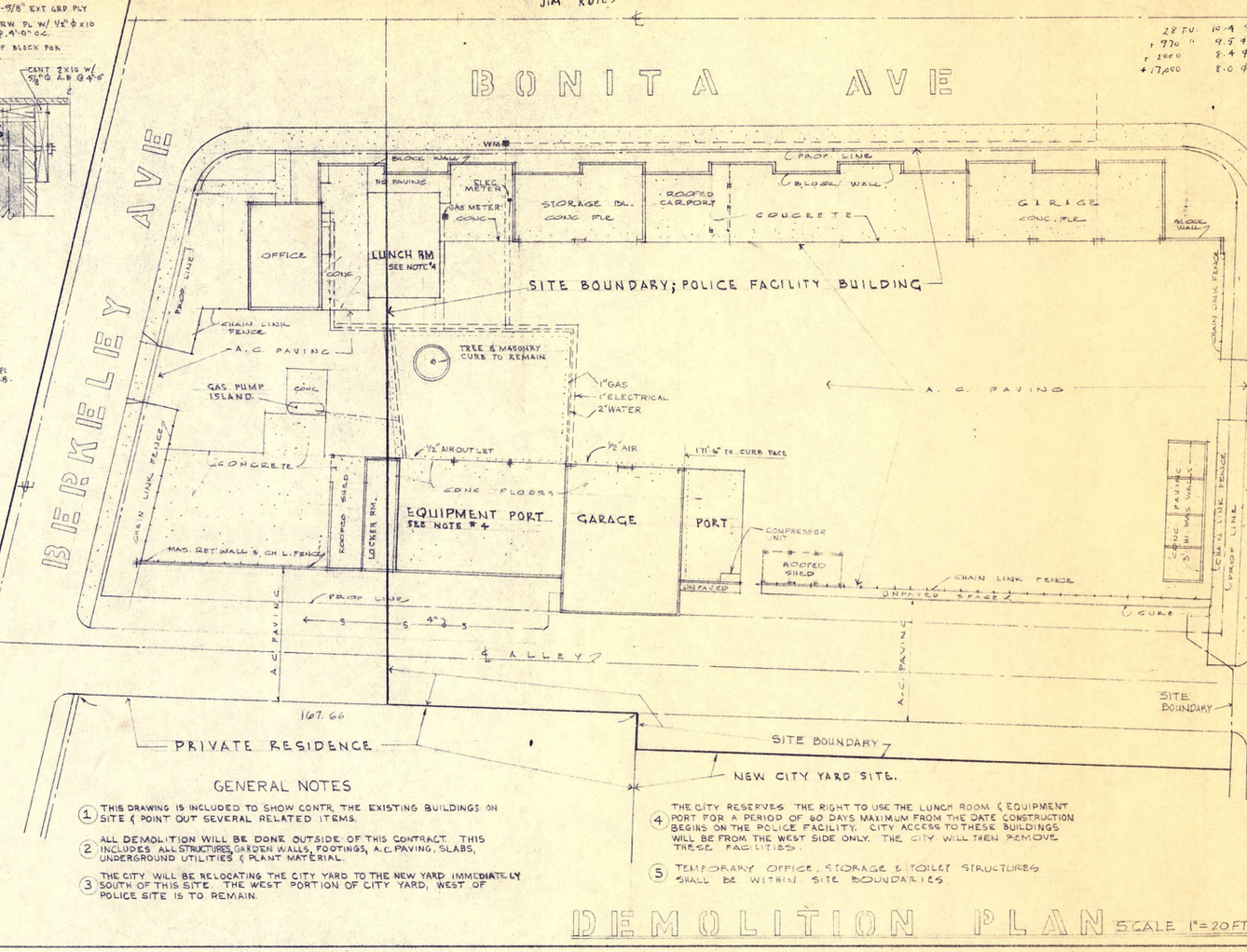
1.00 x $\frac{100}{1.00}$ = 7.0.
100,000 BTU = 7.0.

1.00 C.F. = 1000 BTU / C.F. = GAS RATING

JIM RUIES

28 TU. 10.4 ¢
+ 770 " 9.5 ¢
+ 2000 " 8.4 ¢
+ 17,000 " 8.0 ¢

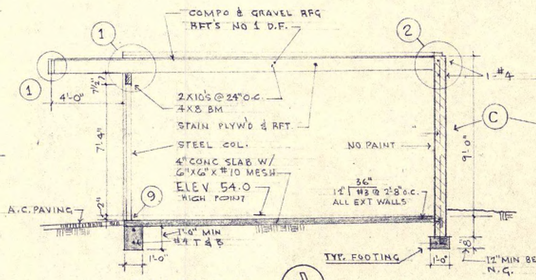


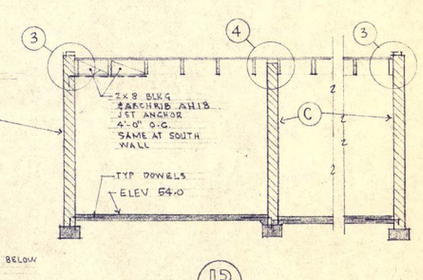


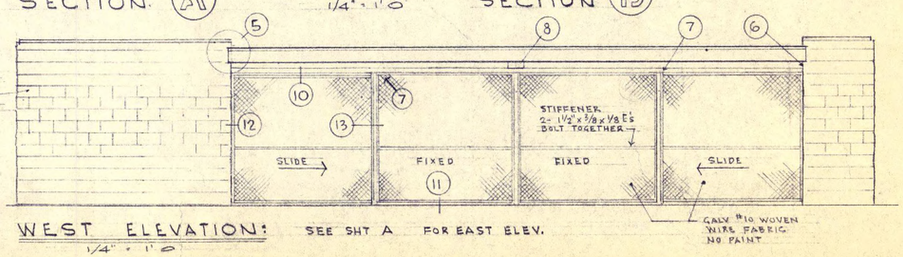
GENERAL NOTES

1. THIS DRAWING IS INCLUDED TO SHOW CONTR. THE EXISTING BUILDINGS ON SITE & POINT OUT SEVERAL RELATED ITEMS.
2. ALL DEMOLITION WILL BE DONE OUTSIDE OF THIS CONTRACT. THIS INCLUDES ALL STRUCTURES, GARDEN WALLS, FOOTINGS, A.C. PAVING, SLABS, UNDERGROUND UTILITIES & PLANT MATERIAL.
3. THE CITY WILL BE RELOCATING THE CITY YARD TO THE NEW YARD IMMEDIATELY SOUTH OF THIS SITE. THE WEST PORTION OF CITY YARD, WEST OF POLICE SITE IS TO REMAIN.
4. THE CITY RESERVES THE RIGHT TO USE THE LUNCH ROOM & EQUIPMENT PORT FOR A PERIOD OF 60 DAYS MAXIMUM FROM THE DATE CONSTRUCTION BEGINS ON THE POLICE FACILITY. CITY ACCESS TO THESE BUILDINGS WILL BE FROM THE WEST SIDE ONLY. THE CITY WILL THEN REMOVE THESE FACILITIES.
5. TEMPORARY OFFICE, STORAGE & TOILET STRUCTURES SHALL BE WITHIN SITE BOUNDARIES

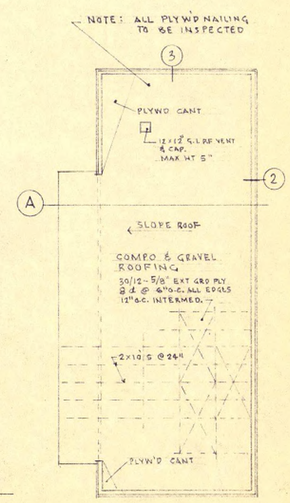
DEMOLITION PLAN SCALE 1" = 20 FT NT



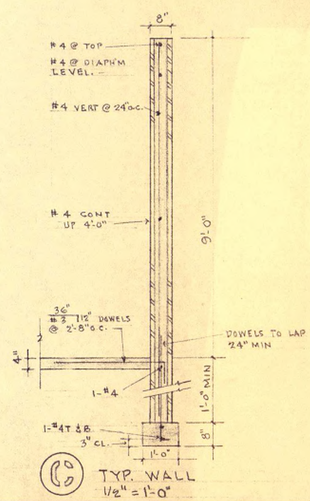




WEST ELEVATION: SEE SHT A FOR EAST ELEV.
1/4" = 1'-0"



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



TYP. WALL
1½" = 1'-0"

A2

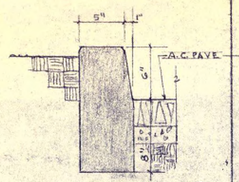
CRILEY & McDOWELL AIA
ARCHITECTS & ASSOCIATES
ARCHITECTURE — PLANNING
1291 N. INDIAN HILL BLVD.
CLAREMONT, CALIF. 91711
TELEPHONE (714) 624-3525

NO. | DATE | REVISIONS

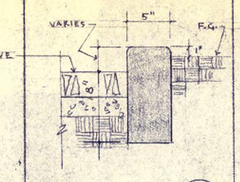
DRAWN BY | CHECKED BY

STORAGE BLDG & DEMOLITION
POLICE FACILITY BUILDING
FOR THE CITY OF CLAREMONT
BONITA AVE. CLAREMONT, CA 91711

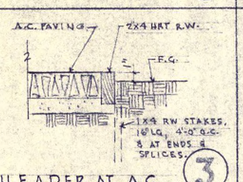
CLAREMONT BLUE



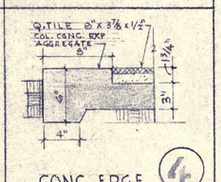
CONC CURB (1)



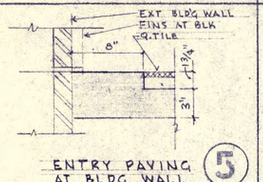
CONC CURB (2)



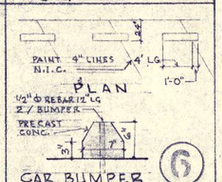
HEADER AT A.C. (3)



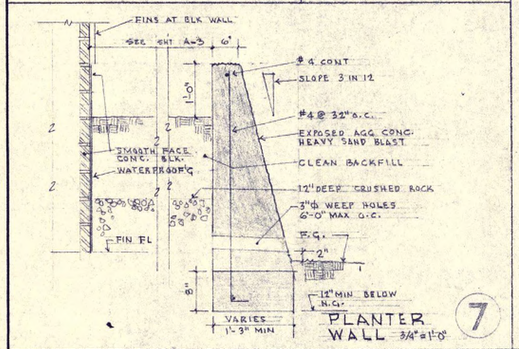
CONC EDGE @ Q. TILE (4)



ENTRY PAVING AT BLDG WALL (5)

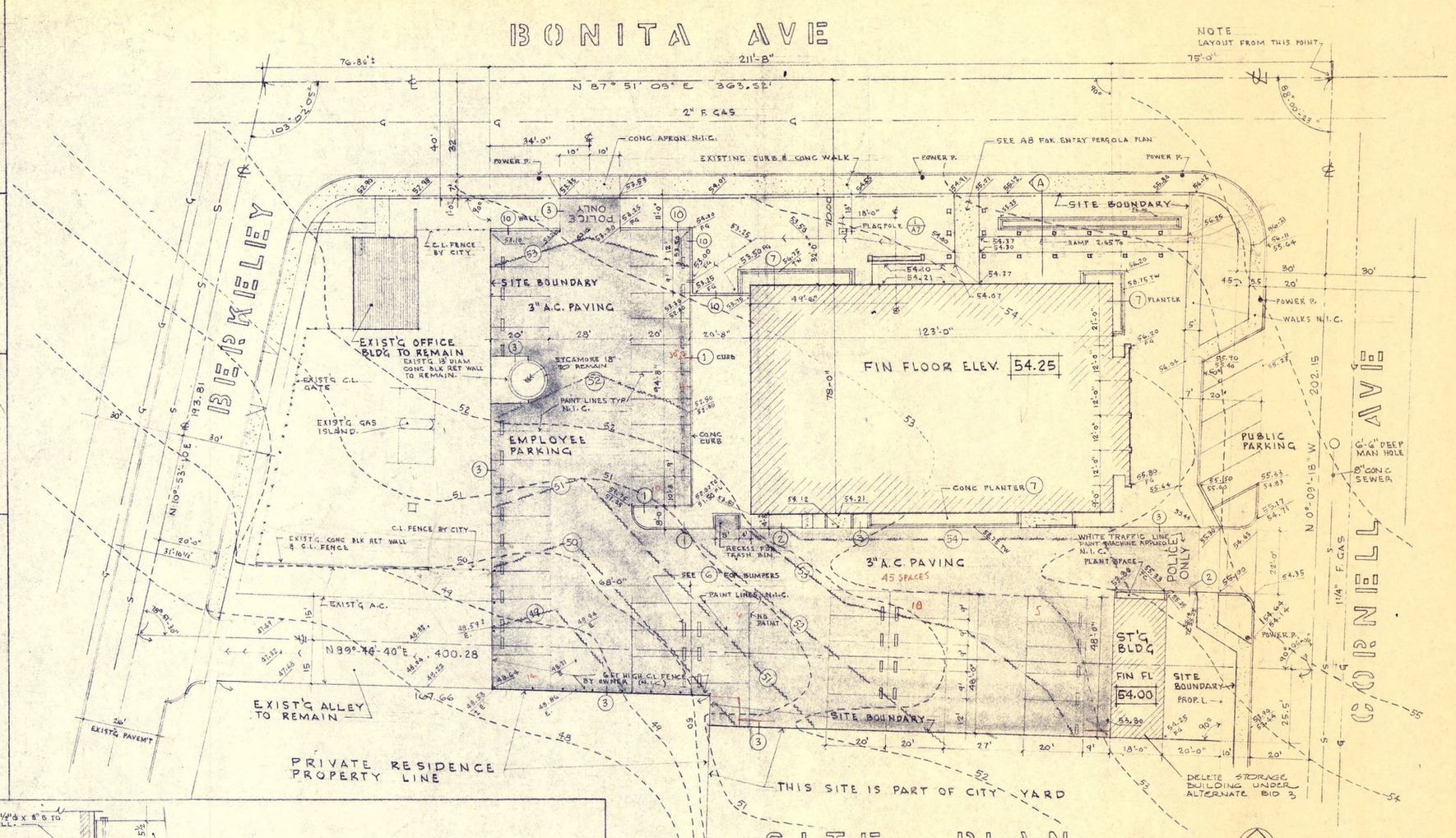


CAR BUMPER (6)



PLANTER WALL 3/4"=1'-0" (7)

BONITA AVE



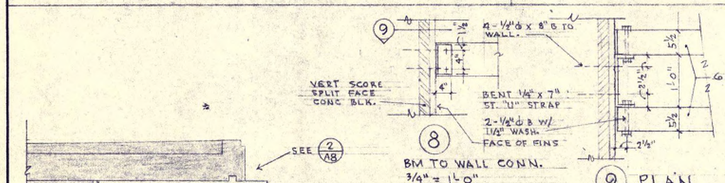
SITE PLAN SCALE 1"=20FT (1N)

GENERAL NOTES

1. ALL STREET IMPROVEMENTS INCLUDING CURBS, GUTTERS, PUBLIC WALKS, & DRIVE APRONS ARE N.I.C. (NOT IN CONTRACT.)

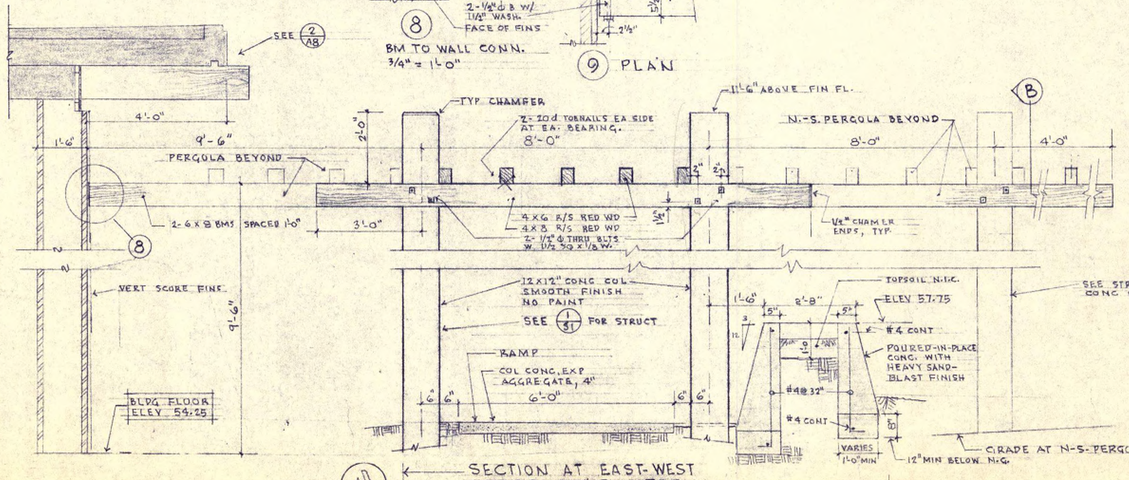
LEGEND

APPROX EXIST'G CONTOURS — 52
NEW CONTOURS 52
A.C. PAVING
CONCRETE PAVING



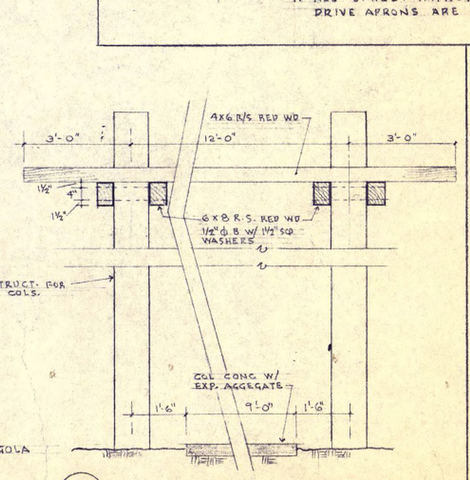
BM TO WALL CONN. 3/4" = 1'-0" (8)

PLAN (9)

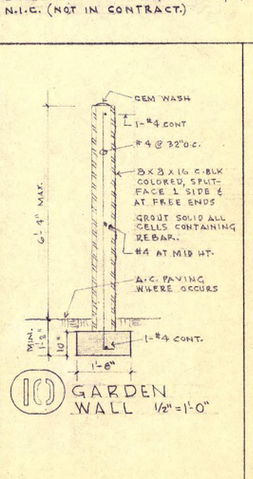


SECTION AT EAST-WEST PERGOLA & PLANTER. (A1)
SCALE ½"=1'-0"

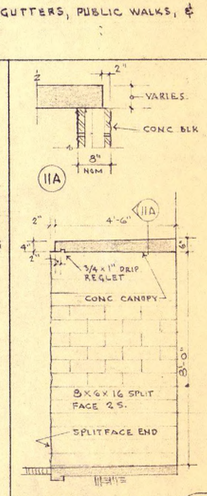
SEE SHT A8 FOR PLAN OF ENTRY PERGOLA



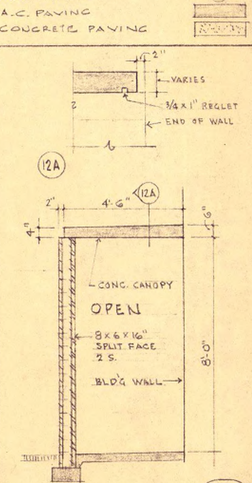
(13) SECTION AT N.-S. ENTRY PERGOLA ½" = 1'-0"



(10) GARDEN WALL ½"=1'-0"



PRISONER ENTRANCE (11)
3/8" = 1'-0"



STAFF ENTRY (12)
3/8" = 1'-0"

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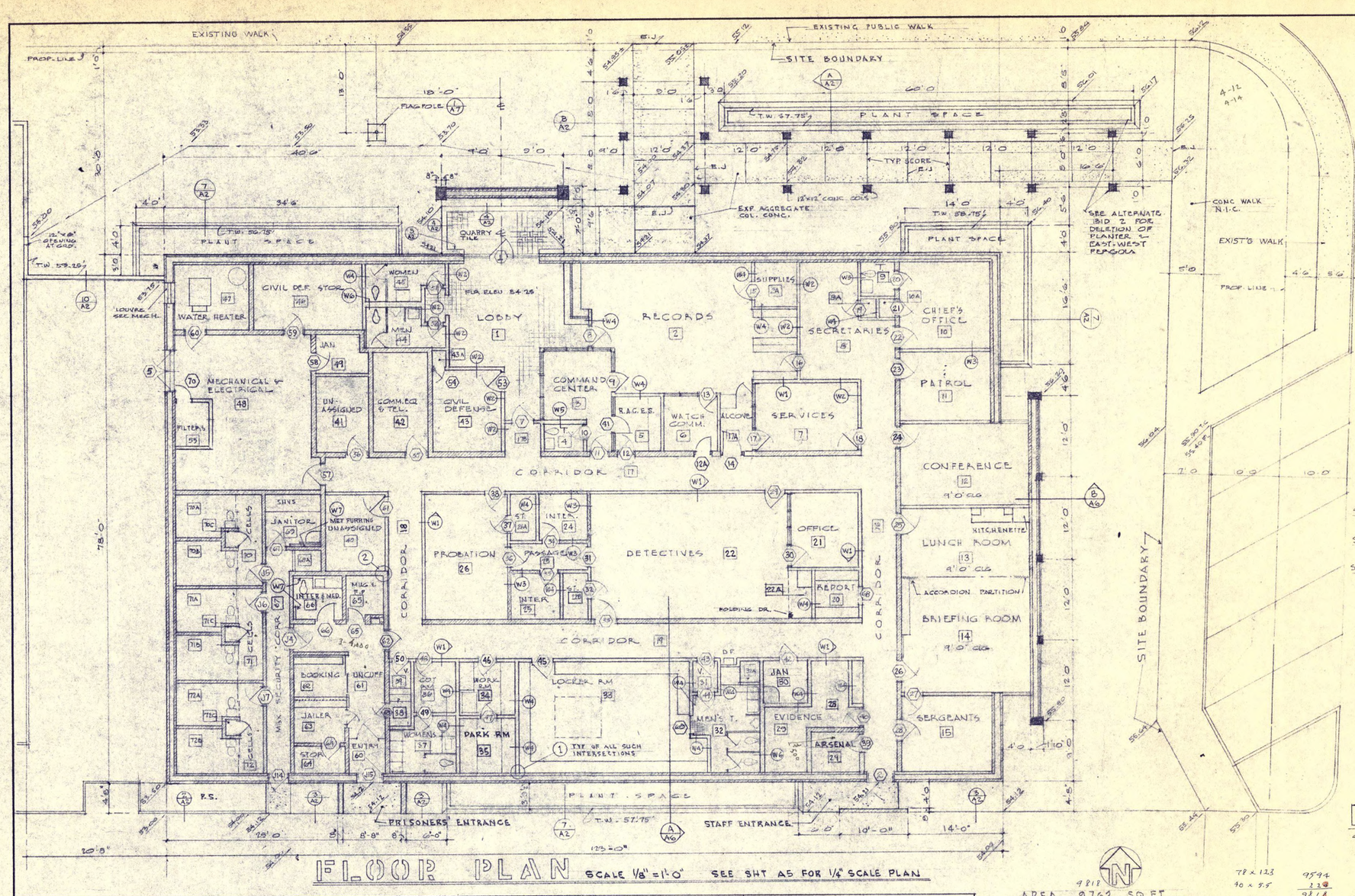
NO.	DATE	REVISIONS

DRAWN BY
CHECKED BY

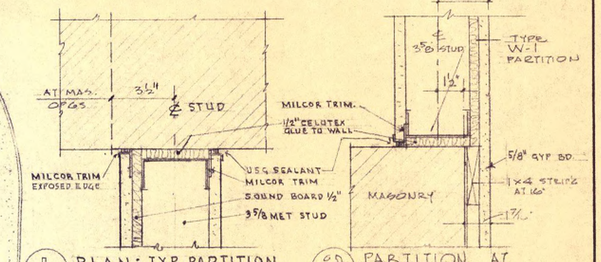
SITE PLAN
POLICE FACILITY BUILDING
for the CITY OF CLAREMONT
570 W. BONITA AVE. CLAREMONT, CALIF.

DATE 6-24-75
JOB NO. 877

SHEET NO. A2

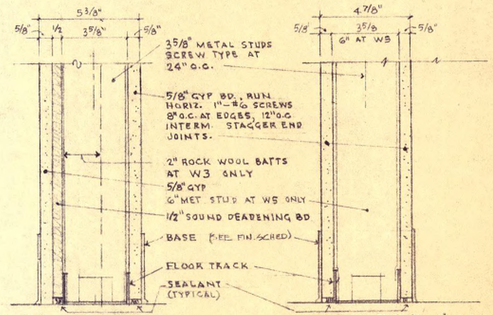


FLOOR PLAN SCALE 1/8"=1'-0" SEE SHT A5 FOR 1/4" SCALE PLAN



1 PLAN: TYP PARTITION TO MASONRY.

2 PARTITION AT MASONRY



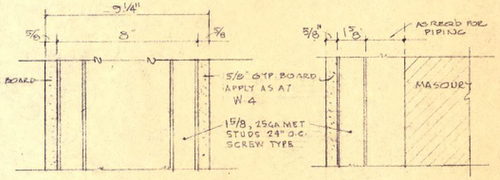
STC 44 — 1'-1" EXTEND 4" ABOVE ADJACENT CEILINGS

STC 44 — 1'-2" SIMILAR - EXTEND TO ROOF SLAB OMIT 5/8" BD ABOVE CLG

STC 50 — 1'-3" SIMILAR TO W-1 ADD SOUND INSULATION

STC 39 — 1'-4" EXTEND 4" ABOVE ADJACENT CEILINGS

1'-5" SAME AS W-4 EXCEPT 6" MET STUDS.



1'-6" EXTEND 4" ABOVE CLG

1'-7" WALL FURRING

NOTES

1. SEE 1/8" SCALE FLOOR PLAN FOR PARTITION CROSS REFERENCE. ALL PARTITIONS (EXCEPT GLAZED PARTITIONS) ARE TYPE W-1 UNLESS SHOWN OTHERWISE

PARTITIONS

SCALE 3" - 1'-0"

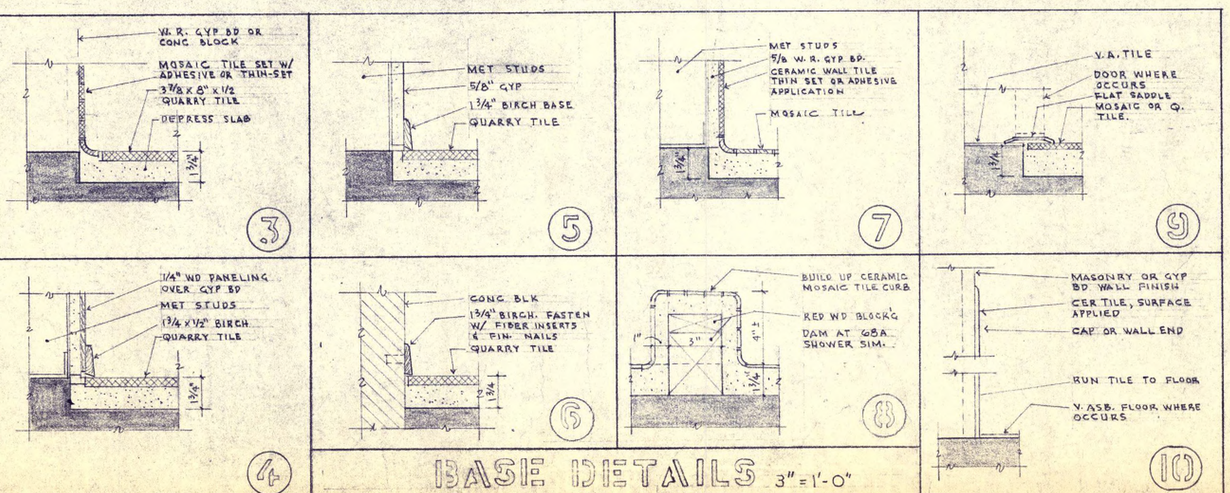
AREA 9762 SQ FT

OCCUPANCY: JAIL AREA = D1
OFFICE AREA = F2

SEPERATION WALLS: 2HR FIRE RATED
INTERIOR BEARING WALLS: 2HR FIRE RATED

78 x 123 = 9594
40 x 5.5 = 220
9814

ADAMS RITE ELECT STRIKE
F.A. ADAMS



BASE DETAILS 3"=1'-0"

CLAREMONT BLUE

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NO.	DATE	REVISIONS

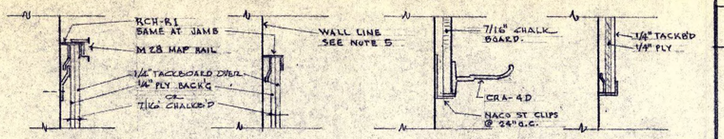
DRAWN BY

CHECKED BY

FLOOR PLAN 1/8" SCALE
POLICE FACILITY BUILDING
FOR THE CITY OF CLAREMONT
570 W. BONITA AVE., CLAREMONT, CA. 91711

DATE 6-21-73
JOB NO. 877

SHEET NO. A3

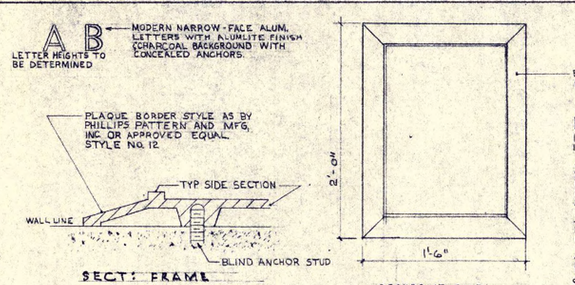


CHALK & TACKBOARD DETAILS 3" = 1'-0"

(1)

GENERAL NOTES:

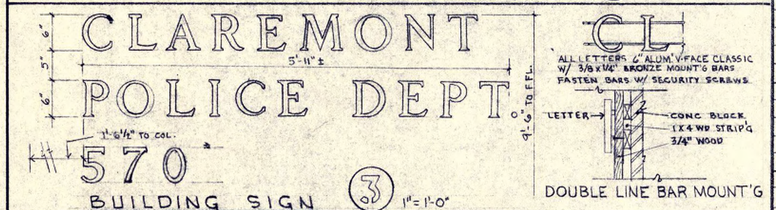
1. DETAIL NUMBERS REFER TO "NELSON ADAMS CO", SERIES 70. OTHER MANUFACTURERS SHALL SUBMIT SAMPLES TO BE REVIEWED BY ARCHITECT FOR APPROVAL.
2. ALL EXPOSED ALUM. TRIM SHALL HAVE MEDIUM BRONZE "COLORANODIC" #82.
3. CHALKBOARD: NACO PORCELAIN STEEL 24 GAUGE, BONDED TO 7/16" PARTICLE BOARD, WHITE COLOR.
4. TACKBOARD: NACO BURLAP PATTERN "KOROSEAL" BONDED TO 1/4" NATURAL CORK. APPLY OVER 1/4" FLY BACKING.
5. WALL SURFACES ARE CONC BLOCK OR DRYWALL OVER MET STUDS. GEN. CONTR. TO PROVIDE SOLID WOOD BACKING AT MET. STUD CONDITION FOR ATTACHMENT OF CHALK & TACK'BD.



NOTES

1. ALLOW FOR APPROX. 12 LINES OF LETTERING.
2. LETTERING SHALL INCLUDE: NAME OF BUILDING AND PARAGRAPH OF APPROX. 5 LINES FOR DEDICATION.
3. OWNER WILL PRESENT INFORMATION TO BE INSTALLED ON PLAQUE.
4. REFER TO SPECIFICATION MISCELLANEOUS SPECIALTIES. SECTION 10 D

(2) BUILDING PLAQUE



BUILDING SIGN (3) 1" = 1'-0"

DOUBLE LINE BAR MOUNT'G

INTERIOR FINISH SCHEDULE

NO.	ROOM	FLOOR	BASE	MAS. WALLS	STUD WALL	CEILING	HT.	WNSCT	CHALK & TACK	TRIM & CABINETS	CNTRS	REMARKS	NO
	① CHANGE TO CARPET	CARPET; PLAIN CONC.; VINYL ASB. TILE; SHEET VINYL; CERAMIC MOSAIC TILE; QUARRY TILE; 2" CONC TOPPING	4" RUBBER CARPET B.; 4" RUBBER TOPSET; 4" FLASH COVE (VINYL); CERAMIC MOSAIC TILE; QUARRYTILE TILE; WOOD; CEM. BASE	EXPOSED BLOCK; STRIP'G + WD PANEL.; STRIP'G + GYP. BD; GLAZED CER. TILE; QUARRYETTE TILE; EXP. SPLIT FACE BLOCK	GYPSUM BD.; W.R. GYP BD; WOOD PANELING; GLAZED CER. TILE; SHOP FRONT & GLASS; QUARRYETTE TILE	2'-4" AC. PANELS & TYPE; 2x2 TYPE "D" AC PANELS; EXPOSED CONC.; GYPSUM BD.; MET LATH & CEM PLASTER; STEEL CEILING, HT.		GLAZED CER. TILE; TACKBOARD; CHALKBOARD	WALNUT; PLASTIC LAM. FACED; BIRCH, GRADE "A"; BIRCH, GRADE "B"; PINE; PLASTIC LAMINATE; BIRCH CNTR.		PAINT SYMBOLS: (O) NO PAINT; (E) EGGSHELL ENAMEL; (EP) EPOXY ENAMEL; (F) FLAT; (S) STAIN; (V) VINYL WALL FABIC	
1	LOBBY			(F)	(V)	(A)	8'-0"					*GYP BD CLG AT ENTRY TO TOILETS	1
2	RECORDS	① X		(F)	(E) O	(A)						METAL FILES N.I.C.	2
2A	SUPPLY RM	X		(F)	(E)					(S)			2A
3	COMMAND CENTER	①		(E)	(E)	(A)							3
4	TOILET	PALESTRA 8435 P	X 5921 P	(V)	(V)	(F)							4
5	R.A.C.E.S.	① X		(E)	(E)	(A)				(S)			5
6	WATCH COMMANDER	① X		(F)	(E)	(A)							6
7	SERVICES	① X		(F)	(E)	(A)							7
8	SECRETARIES	X		(F)	(E)	(A)							8
8A	CLOSET	PALESTRA 8635 P		(F)	(E)	(F)	7'-11"			(E)			8A
9	TOILET	X	X 1977 P	(V)	(V)	(F)	7'-11"						9
10	CHIEF'S OFFICE		AT WD WALL	(*) O	O		8'-0"					PREFINISHED WD PANELING	10
10A	CLOSET			(F)	(E)	(F)	7'-11"			(E)			10A
11	PATROL			(F)	(E)	(A)	8'-0"						11
12	CONFERENCE		AT WD WALL	O	O		9'-0"					CEM PLAS WALL FINISH UNDER WINDOW. PREFINISHED WD. PANELING	12
13	LUNCH RM	PALESTRA	5921 P	(E)	(E) O	(A)	9'-0"			(S)			13
14	BRIEFING RM	PALESTRA 8635 P	5921 P	(F)	(E) O	(A)	9'-0"			(S)		CEM PLAS WALL FINISH UNDER WINDOW.	14
15	SERGEANTS RM			(E)	(E)	(A)	8'-0"			(S)			15
16, 16A 17, 17A&B 18, 19	CORRIDORS & ALCOVES	X (ALL EXCEPT 19)		(E)	(E)	(C) 1 HR FIRE RATING.						1 HR CEILING	16, 16A 17, 17A&B 18, 19
20	REPORT	X		(E)	(E)	(C) 1 HR FIRE RATING.				(S)		1 HR CEILING	20
21	OFFICE	X		(E)	(E)	(A)							21
22	DETECTIVES OFFICE	X		(E)	(E)	(A)							22
22A&B	STORAGE RM 22A ONLY	X		(E)	(F)					(E)			22A&B
23	PASSAGE	X			(F)	(A)							23
24&25	INTERROGATION	X		(E)	(E)	(B)							24&25
26	PROBATION	X		(E)	(E)	(A)							26
26A	STORAGE	X			(F)	(F)	↓						26A
27	ARSENAL	X		(E)	(E)	(O)	12'-0"			(S)	(S)		27
28	EVIDENCE	X		(E)	(E)	(F)	8'-0"			(S)			28
29	EVIDENCE	X		(E)	(E)	(F)				(S)			29
30	JANITOR	X			(E) (*)	(F)				(S)		*W.R. GYP BEHIND TILE	30
31	VESTIBULE	X			(E)	(F)							31
32	MEN'S TOILET			(EP)	(EP)	(A)	↓					PLASTIC FACED TOILET STALLS MET. LOCKERS	32
32A	SHOWER				(*)	(F)	7'-0"					*W.R. GYP. BD.	32A
33	LOCKER RM			(E)	(E)	(A)	8'-0"					MET LKRS,	33
34	PHOTO WORK RM				(E) (E)	(F)				(E)		W.R. GYP AT SINK WALL ONLY	34
35	DARK RM			(E)	(E) (E)	(F)				(E)		W.R. GYP AT SINK WALL ONLY	35
36	COT RM				(E)	(A)							36
37	WOMEN'S TOILET			(EP)	(EP)	(A)				(E)		PLASTIC FACED TOILET STALLS MET. LOCKERS.	37
38&39	VISITOR & PRISONER			(E)	(E)					(E)		GLASS DIVIDER ½" TEMP.	38&39
40	OFFICE (UNASSIGNED)			(F)	(F)	(A)							40
41	OFFICE (UNASSIGNED)			(F)	(F)	(A)							41
42	COMMUNICATION EQUIP. & TELEPH			(F)		(F)							42
43	CIVIL DEFENSE			(F)	(F)	(A)							43
44	MEN'S TOILET					(E)						PLASTIC LAM STALL	44
45	WOMEN'S TOILET					(E)	↓					PLASTIC LAM STALL	45
46	CIVIL DEFENSE & STORAGE		(*) AT GYP BD	(F)	(F)	(O)	12'-0"						46
47	HEATER RM.		NONE	(O)		(O)	12'-0"						47
48	MECHANICAL RM		(*) AT GYP BD	(F)	(F)	(O)	12'-0"						48
60	ENTRY			(E)		(F)	8'-0"					ENAM ON STEEL GRILL, TYPICAL	60
61	UNCUFFING AREA	(*)		(E)		(F)						DEPRESS SLAB 12" WIDE AT ST. GRILLE.	61
62&63	BOOKING & JAILER			(E)		(F)						ENAM. ON STEEL GRILL	62&63
64	STORAGE		NONE	(E)		(F)				(S)			64
65	MUGGING		(*) AT CAB	(E)		(A)				(S)			65
66	INTERROGATION & MEDICAL		(*) AT CAB	(EP)		(A)				(S)			66
67	MAXIMUM SECURITY CORRIDOR			(E)		(F)	↓						67
68	SHOWER					(F)	8'-0"						68
69	JANITOR			(E) PNT UP TO BRT	(E)	O	12'-0"					D. FIR PLANK SHVS.	69
70, 71, 72	OBSERVATION AREAS, & CELLS			(E)		(E)	8'-0"					STEEL CLG AT CELLS; ENAM OF GRILLES	70, A, B, & C
70C, 71C, 72C	PLUMBING CORES		NONE	(O)									71, A, B, & C
													72, A, B, & C

REVISIONS

NO	DATE

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CLAREMONT, CALIF. 91711
TELEPHONE (714) 624-3525

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INTERIOR FINISH SCHEDULE

POLICE FACILITY BUILDING
for the CITY OF CLAREMONT
570 W. BONITA AVE. CLAREMONT CALIF

DATE 6-25-70
JOB NO. 877

SHEET NO. A4

CLAREMONT BLUE

FLOOR PLAN

SCALE 1/4" = 1'-0"

HEATER RM. 47 · CIVIL DEFENSE STORAGE 46 · WOMEN'S TOILET 45 · MEN'S TOILET 44 · JAN. 49 · LOBBY 1 · RECORDS 2 · SUPPLIES 2A · TOILET 9 · SECRETARIES 8 · CHIEF'S OFFICE 10 · PATROL 11 · FILTERS 49 · MECHANICAL RM 48 · UNASSIGNED 41 · COMMUNICATION EQUIPMENT & TELEPHONE 42 · CIVIL DEFENSE 43 · COMMAND CENTER 3 · RACES 5 · WATCH COMM. 6 · ALCOVE 17A · SERVICES 7 · CONFERENCE 12 · CORRIDOR 17 · ALCOVE 17B · TOILET 4

OBSERV 70 · JAN. 69 · UNASSIGNED 40 · SHOWER 68 · INTER & MED 66 · MUGGING 65 · BOOKING 62 · JAILER 63 · STORAGE 64 · UNCUFF 61 · VISIT. 39 · COT RM 36 · PRIS 38 · WOMEN'S TOILET 37 · ENTRY 60 · SECURITY CORRIDOR 67 · CORRIDOR 18 · PROBATION 26 · STORAGE 26A · INTERROGATION 24 · PASSAGE 23 · INTERROGATION 25 · STORAGE 25A · CORRIDOR 19 · PHOTO WORK RM 34 · DARK RM. 35 · GYM EQUIPM'T N.I.C. · LOCKER RM. 33 · MEN'S TOILET 32 · VEST 31 · JAN. 30 · EVIDENCE 29 · DETECTIVES 22 · OFFICE 21 · REPORT 20 · CORRIDOR 16 · ARSENAL 27 · SERGEANTS 15 · LUNCH ROOM 13 · BRIEFING RM. 14

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TELEPHONE (714) 624-3525

NO. | DATE | REVISIONS

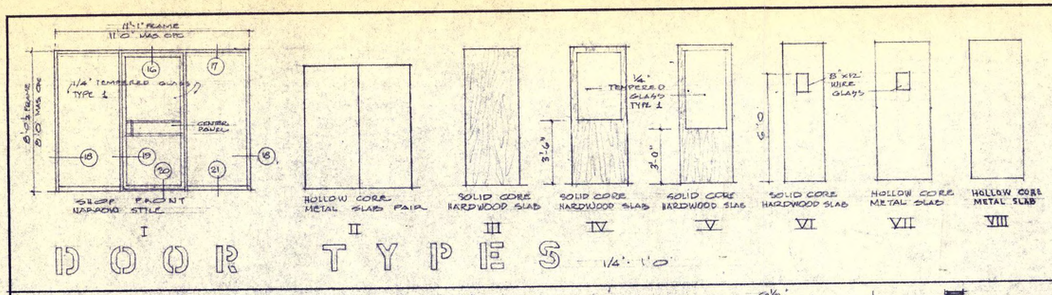
DRAWN BY | CHECKED BY

FLOOR PLAN 1/4" SCALE
POLICE FACILITY BUILDING
for the CITY OF CLAREMONT
370 W. BONITA AVE. CLAREMONT, CA. 91711

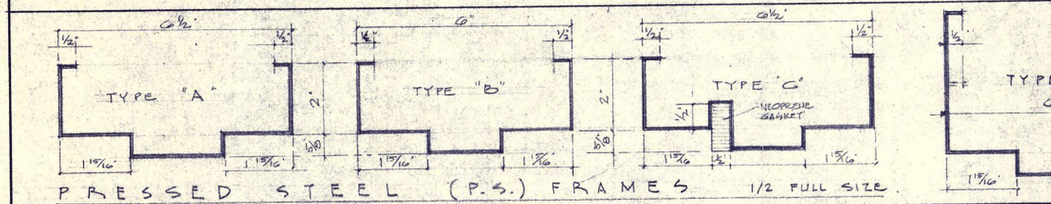
DATE 6-22-73
JOB NO. 877

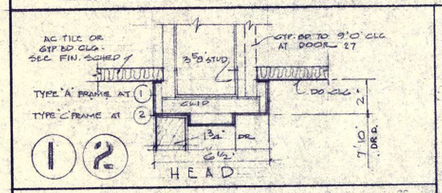
SHEET NO. A5

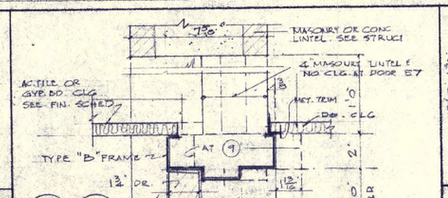
CLAREMONT BLUE

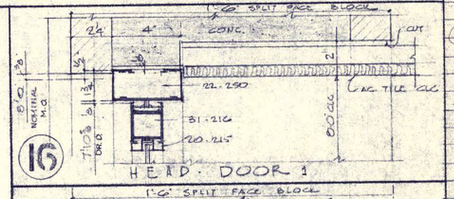


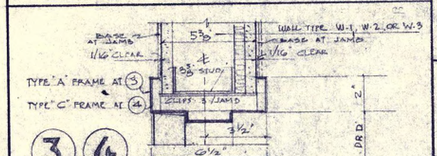
DOOR TYPES 1/4" = 1'-0"

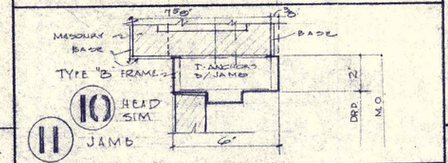


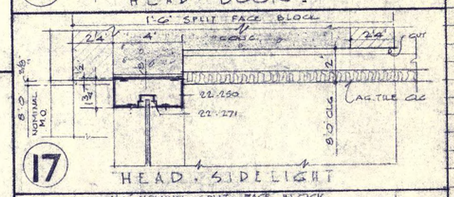


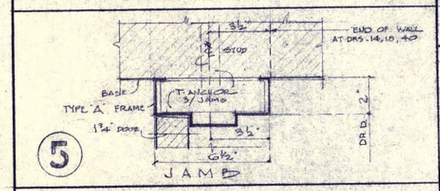


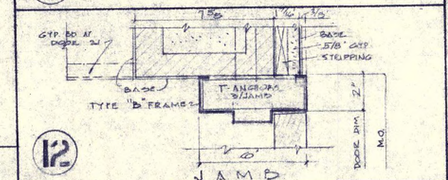


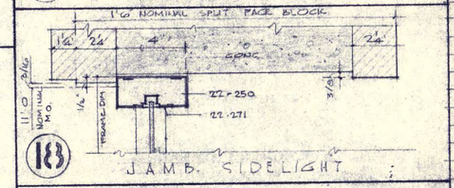


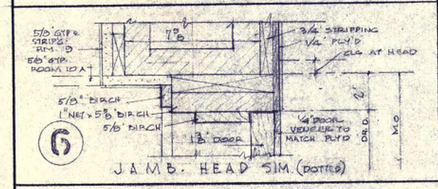


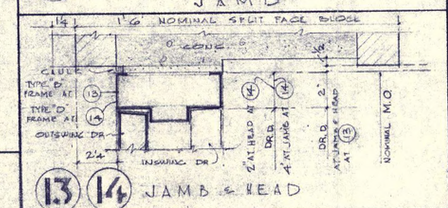


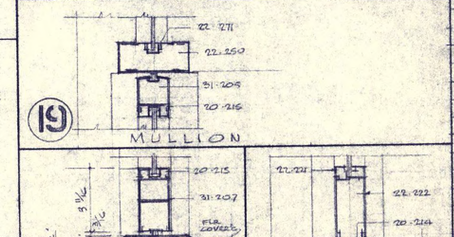


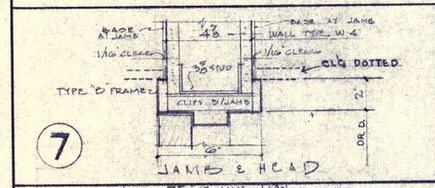


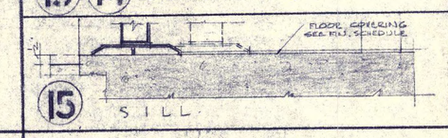


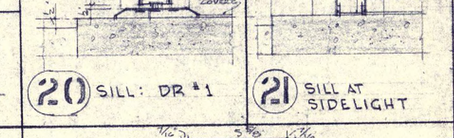


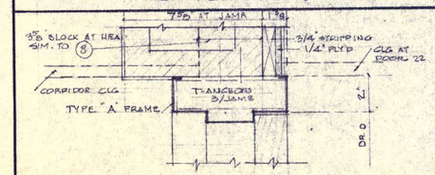


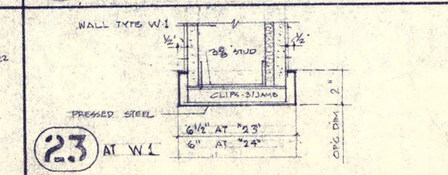


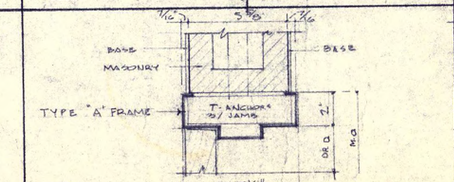












FRAME DETAILS 3"=1'-0"

DOOR SCHEDULE

MARK	FROM RM	TO RM	TYPE	SIZE DOOR DIMENSION	DESCRIPTION S.C. SOLID CORE H.C. HOLLOW CORE	FRAME WALL TYPE OR MAT'L	FRAME	DETAILS: THIS SHEET UNLESS NOTED OTHERWISE HEAD	JAMB	JAMB	SILL	REMARKS NOTES (A) 20 MIN FIRE LABEL G.P. - GLAZED PARTITION	HDWR SET #	MARK
1	1	EXT.	I	3'-6" x 7'-10 7/8" x 1 3/4"	SHOP FRONT	MAS	ALUM	16	19	19	20	TYPE 1 GLASS	1	1
2	16	EXT	VIII	3'-4" x 6'-10" x 1 3/4	H.C. MET SLAB	MAS	PS	14	14	14	15		2	2
5	48	EXT	II	PR 5'-8" x 7'-10" x 1 3/4	" " "	MAS	P.S.	13	13	13	15		3	5
6	STORAGE BLDG		VIII	3'-8" x 7'-10" x 1 3/4	" " "	MAS		10	11	11			4	6
7	17	1	III	3'-4" x 7'-10" x 1 3/4	S.C. HARDWOOD SLAB	W1		3	3	3			5	7
8	1	2	III	3'-0" x 7'-10 3/8" x 1 3/4"	" " "	W4		7	7	11 A/D		TYPE 1 GLASS	6	8
9	3	2	IV	3'-0" x 7'-10 3/8" x 1 3/4"	S.C. HARDWD & GLASS PAN	G.P.		2 A/D	11 A/D	4 A/D		TYPE 1 GLASS	7	9
10	3	4	III	2'-4" x 7'-0" x 1 3/4"	S.C. HARDWOOD SLAB	W1		1	3	3			8	10
11	17	3	III	2'-4" x 7'-10" x 1 3/4	" " "	MAS		8	11	11		NOTE (A)	7	11
12 & 12A	17 17	5 6	III	2'-4" x 7'-10" x 1 3/4	" " "	"		8	11	11		NOTE (A)	7	12 & 12A
13	2	6	V	2'-6" x 7'-10 3/8" x 1 3/4	S.C. HARDWD & GLASS PAN	G.P.		2 A/D	9 A/D	4 A/D		TYPE 1 GLASS	7	13
14	17	17A	III	3'-0" x 7'-10" x 1 3/4"	S.C. HARDWOOD SLAB	W1		1	5	5		NOTE (A)	7	14
15	2A	2	III	2'-8" x 7'-0" x 1 3/4"	" " "	W-4		7	7	7			7	15
16	8	2	III	2'-4" x 7'-10" x 1 3/4"	" " "	W-2		1	3	3		NOTE (A)	6	16
17	17A	7	V	3'-0" x 7'-10 3/8" x 1 3/4	S.C. HARDWD & GLASS PAN	G.P.		2 A/D	8 A/D	4 A/D		TYPE 1 GLASS	7	17
18	16	7	III	3'-0" x 7'-10" x 1 3/4"	S.C. HARDWOOD SLAB	W-2		1	5	3		NOTE (A)	7	18
19	8A	8	III	2'-4" x 7'-0" x 1 3/4"	" " "	W-1	▼	3	3	3			7	19
20	9	10	III	2'-4" x 7'-10" x 1 3/4	" " "	MAS	WD	6	6	6		DOOR VENEER TO MATCH PLYD	8	20
21	10A	10	III	2'-4" x 7'-10" x 1 3/4	" " "	"	▼	6	6	6		" " " Steel frame	7	21
22	8	10	III	3'-0" x 7'-10" x 1 3/4"	" " "	"	P.S.	22	22	22			6	22
23	8	11	III	3'-0" x 7'-10" x 1 3/4	" " "	"	PS	8	11	11		NOTE (A)	6	23
24	16	12	III	3'-0" x 7'-10" x 1 3/4	" " "	"		22	22	22		NOTE (A)	7	24
25	16	13	III	3'-0" x 7'-10" x 1 3/4	" " "	"		8	11	11		" " NO LATCH SELF CLOSING	9	25
26	16	14	III	3'-0" x 7'-10" x 1 3/4	" " "	"		8	11	11		" " "	9	26
27	14	15	III	2'-6" x 6'-10" x 1 3/4	" " "	"		1	5	3			7	27
28	16	15	III	3'-0" x 7'-10" x 1 3/4	" " "	"		8	11	11		NOTE (A)	7	28
29	17	22	III	3'-0" x 7'-10" x 1 3/4	" " "	W-1		3	3	3		" "	7	29
30	22	21	V	3'-0" x 7'-10 3/8" x 1 3/4	S.C. HRDWD. SLAB; GL PANEL	G.P.		22 A/D	9 A/D	4 A/D		TYPE 1 GLASS	7	30
31	22	23	III	3'-0" x 7'-10" x 1 3/4	S.C. HRDWD. SLAB	W-1		1	3	3			7	31
32	22B	22	III	2'-8" x 7'-0" x 1 3/8	" " "	W-1		3	3	3			7	32
33	19	22	III	3'-0" x 7'-10" x 1 3/4"	" " "	MAS		8	11	11		NOTE (A)	7	33
34	23	24	III	2'-8" x 7'-0" x 1 3/4"	" " "	W-3		4	4	4		FRAME TYPE "C"	7	34
35	23	25	III	2'-8" x 7'-0" x 1 3/4"	" " "	W-3		4	4	4		" " "	7	35
36	26	23	III	3'-0" x 7'-10" x 1 3/4"	" " "	W-1		1	3	3			7	36
37	26A	26	III	2'-8" x 7'-0" x 1 3/4"	" " " 1 3/8" CHANGE	W-1		1	3	3			7	37
38	17	26	III	3'-0" x 7'-10" x 1 3/4	" " "	W-1		1	3	3		NOTE (A)	7	38
39	16	27	VIII	3'-0" x 7'-10" x 1 3/4	H.C. METAL SLAB	MAS		8	11	11		" "	6	39
40	16	28	VIII	2'-8" x 7'-10" x 1 3/8"	H.C. METAL SLAB	W-1		1	5	3		" "	6	40
41	3	5	IV	2'-6" x 7'-10" x 1 3/4"	S.C. HRDWD; GL. PANEL	G.P.		2 A/D	4 A/D	4 A/D		TYPE 1 GLASS	7	41
42	30	19	III	2'-8" x 7'-10" x 1 3/4	S.C. HRDWD SLAB	W1		1	3	3		NOTE (A)	7	42
43	19	31	III	2'-8" x 7'-10" x 1 3/4	" " "	W1		1	3	3		" "	9	43
44	31	32	III	2'-8" x 7'-0" x 1 3/8"	" " "	W4		7	7	7			9	44
45	19	33	III	3'-0" x 7'-10" x 1 3/4"	" " "	W1		1	3	3		NOTE (A)	9	45
46	19	34	III	2'-8" x 7'-10" x 1 3/4"	" " "	W1		2	4	4		" " 5 FRAME TYPE "C"	6	46
47	34	35	III	2'-4" x 7'-0" x 1 3/4"	" " "	W1		4	4	4		FRAME TYPE "C"	8	47
48	19	36	III	2'-4" x 7'-10" x 1 3/4	" " "	W1		1	3	3		NOTE (A)	9	48
49	36	37	III	2'-4" x 7'-0" x 1 3/4	" " "	W4		7	7	7			9	49
50	19	39	VI	2'-4" x 7'-10" x 1 3/4	" " "	W1		1	3	3		NOTE (A); WIRE GL. PANEL	7	50
51	1	45	III	2'-8" x 7'-0" x 1 3/4"	" " "	W2		3	3	3		" "	9	51
52	1	44	III	2'-8" x 7'-0" x 1 3/4"	" " "	W2		3	3	3		" "	9	52
53	1	43	III	3'-0" x 7'-10" x 1 3/4"	" " "	W2		1	3	3		" "	6	53
54	43A	43	III	2'-0" x 7'-0" x 1 3/4	1 3/8 CHANGE "	W1		3	3	3			7	54
55	17	42	III	3'-0" x 7'-10" x 1 3/4"	" " "	MAS		8	11	11		NOTE (A)	6	55
56	17	41	III	3'-0" x 7'-10" x 1 3/4"	" " "	"		8	11	11		" "	6	56
57	17	48	VII	3'-0" x 7'-10" x 1 3/4"	H.C. METAL SLAB	"		8	11	11		" "	6	57
58	48	49	VIII	2'-4" x 7'-10" x 1 3/4"	" " "	"		10	11	11			7	58
59	48	46	VIII	3'-0" x 7'-10" x 1 3/4	" " "	"		10	11	11			7	59
60	47	48	VIII	3'-0" x 7'-10" x 1 3/4	" " "	"		10	11	11			7	60
61	18	40	III	3'-0" x 7'-10" x 1 3/4	S.C. HRDWD SLAB	W-2		1	3	3			6	61
62	62	19	VII	3'-0" x 7'-10" x 1 3/4"	H.C. METAL SLAB	MAS.		9	12	12		NOTE (A) ?	7	62
63	38	62	VII	2'-0" x 6'-10" x 1 3/8"	" " "	"		8	11	11		1 1/2 HR LABEL - 12 GA FRAME	7	63
64	64	65	III	2'-4" x 6'-10" x 1 3/4	S.C. HARDWOOD SLAB	"		25	25	25		" " " 120 ALL	7	64
65	62	66	VIII	2'-8" x 6'-10" x 1 3/4"	H.C. METAL SLAB	"		10	11	11			7	65
66	62	67	VIII	2'-8" x 6'-10" x 1 3/4"	H.C. METAL SLAB	"		10	11	11			8	66
67	68	69	VIII	2'-8" x 6'-10" x 1 3/4"	H.C. METAL SLAB	"		25	25	25			6	67
68	K6	20		2'-8 x 6'-8"	CASED OPG. NO DOOR	W1		23	23	23			—	68
69	32	33		3'-0" x 6'-8"	" " "	W4	▼	24	24	24			—	69
70	40	48	VIII	2'-6" x 6'-8" x 1 3/8	H.C. MET SLAB	W4	PS	7	7	7			7	70

NO.	DATE	REVISIONS
1	8/23	ADD SEP KEY
2	8/23	ADD SEP KEY

CRILEY & MC DOWELL
ARCHITECTS & ASSOCIATES
ARCHITECTURE — PLANNING
1261 N. INDIAN HILL BLVD.
CLAREMONT, CALIF. 91711
TELEPHONE (714) 624-8866

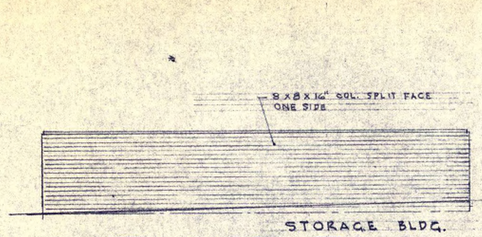
DRAWN BY LK CHECKED BY

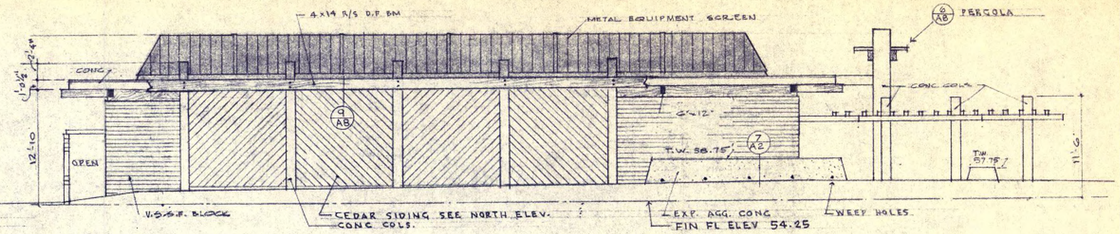
DOOR SCHEDULE
POLICE FACILITY BUILDING
for the CITY OF CLAREMONT
570 W. BONITA AVE. CLAREMONT, CALIF.

DATE 6-22-73
JOB NO. 877

SHEET NO. A6

CLAREMONT BLUE

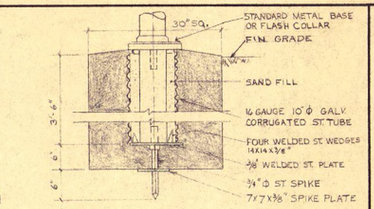




EAST

CORNELL AVE FACADE

NOTE: V.S.S.F. INDICATED VERTICAL SCORED SPLIT FACE (COLORED COMPONENTS)

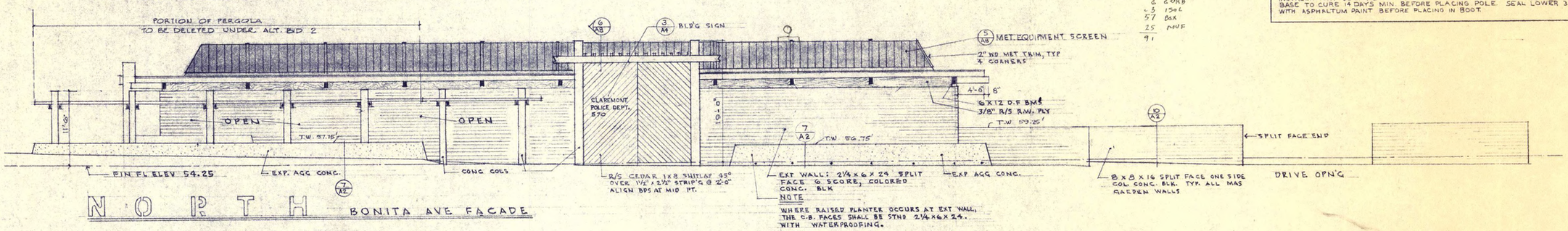


FLAGPOLE

POLE: CONE TAPPED ALUM. BAARTOL CO. INC. AS HANDLED BY M.H. POWELL CO., LOS ANGELES 24, 213-870-5476 OR APPROVED EQUAL. 35' HIGH, BUTT DIAM. 7", TOP DIAM 3 1/2", 6"Φ ALUM. BALL AT TOP. 3'-6" OF POLE INTO GROUND, STANDARD FINISH .0043-T6 ALUM., WALL THICKNESS .188. FURNISH STANDARD STEEL TUBE BASE ANCHOR AS SHOWN ON DETAIL ABOVE, WITH STANDARD ALUM. BASE COLLAR.

FITTING: SUPPLY STANDARD SIZE ALUM. TRUCK WITH TWO 2 1/2" DIAM NYLON SHEAVES. ALUM. FLAGSNAPS WITH VINYL COVERS. 3/16" DIAM. POLYPROPYLENE WHITE ROPE HALYARDS. CAST ALUMINUM HALYARD CLEAT.

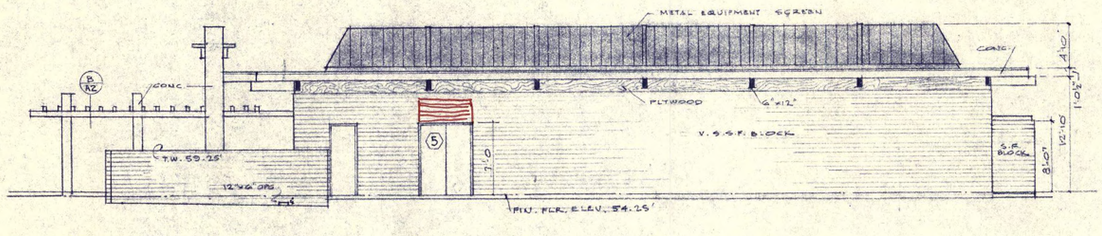
INSTALLATION: GENERAL CONTRACTOR TO INSTALL FLAGPOLE COMPLETE. CONC. BASE TO CURE 14 DAYS MIN. BEFORE PLACING POLE. SEAL LOWER 3'-0" OF POLE WITH ASPHALTUM PAINT BEFORE PLACING IN BOOT.



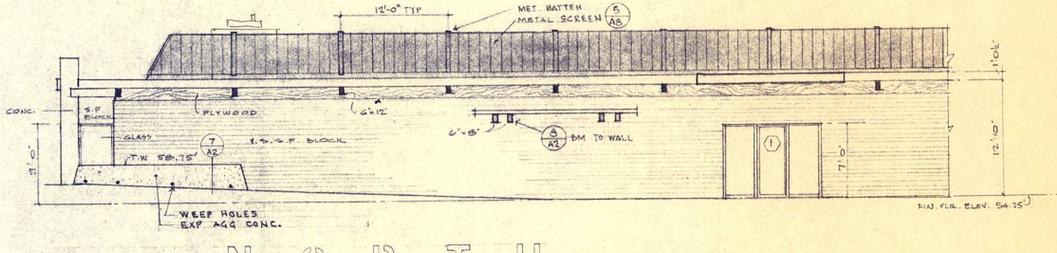
4 CYRB
4 15GL
57 BOX
25 MUF
91

NORTH

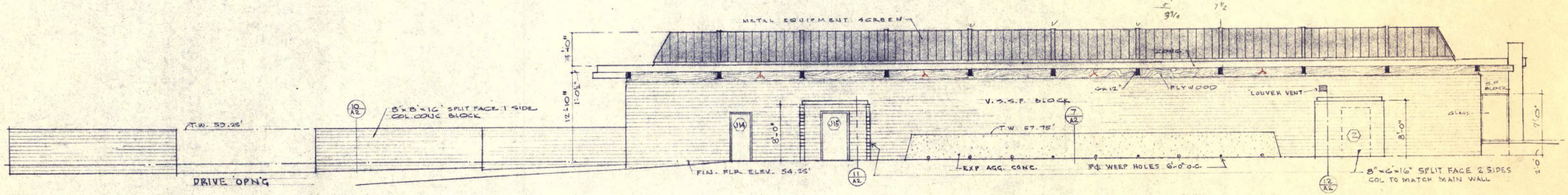
BONITA AVE FACADE



WEST

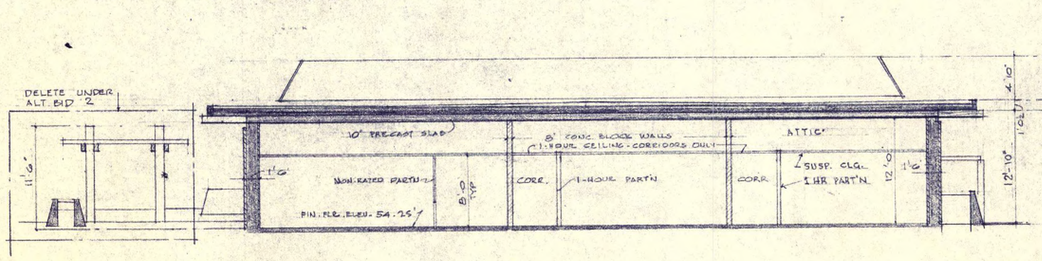


PART NORTH AT BUILDING

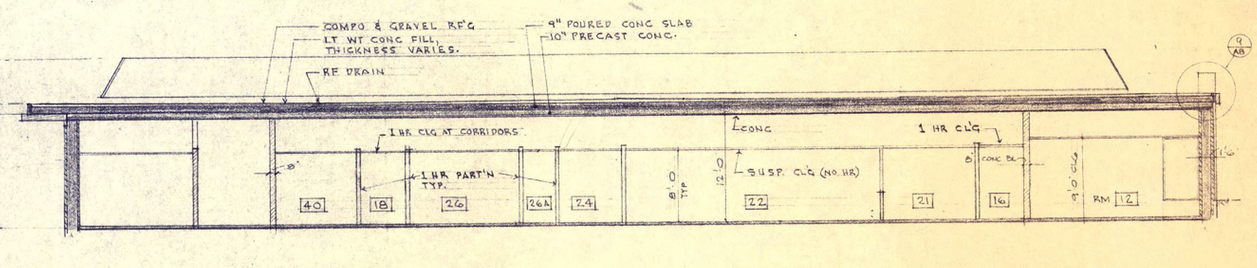


SOUTH

(8+4)x2 = 24
24 — 12' LG
8 — 10' LG



SECT. A-A



SECT. B-B

ELEVATIONS AND SECTIONS

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

CLAREMONT BLUE

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CLAREMONT, CALIF. 91711
TELEPHONE (714) 624-3525

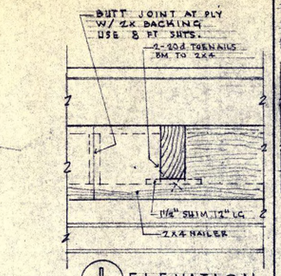
NO. | DATE | REVISIONS

DRAWN BY | CHECKED BY

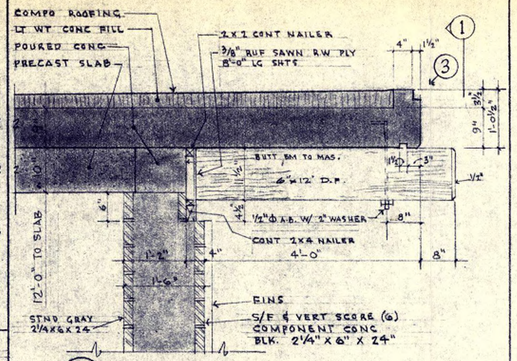
ELEVATIONS & SECTIONS
POLICE FACILITY BUILDING
FOR THE CITY OF CLAREMONT
570 W. BONITA AVE., CLAREMONT, CA. 91711

DATE: 6-24-77
JOB NO. 877

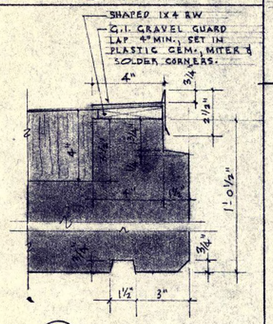
SHEET NO. A7



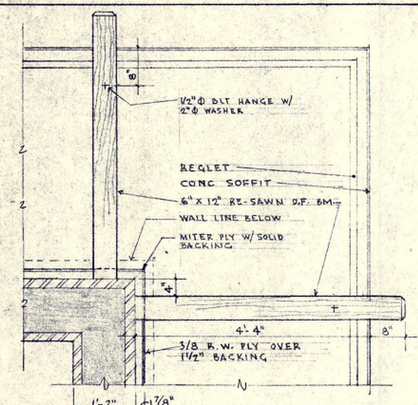
1 ELEVATION
3/4" = 1'-0"



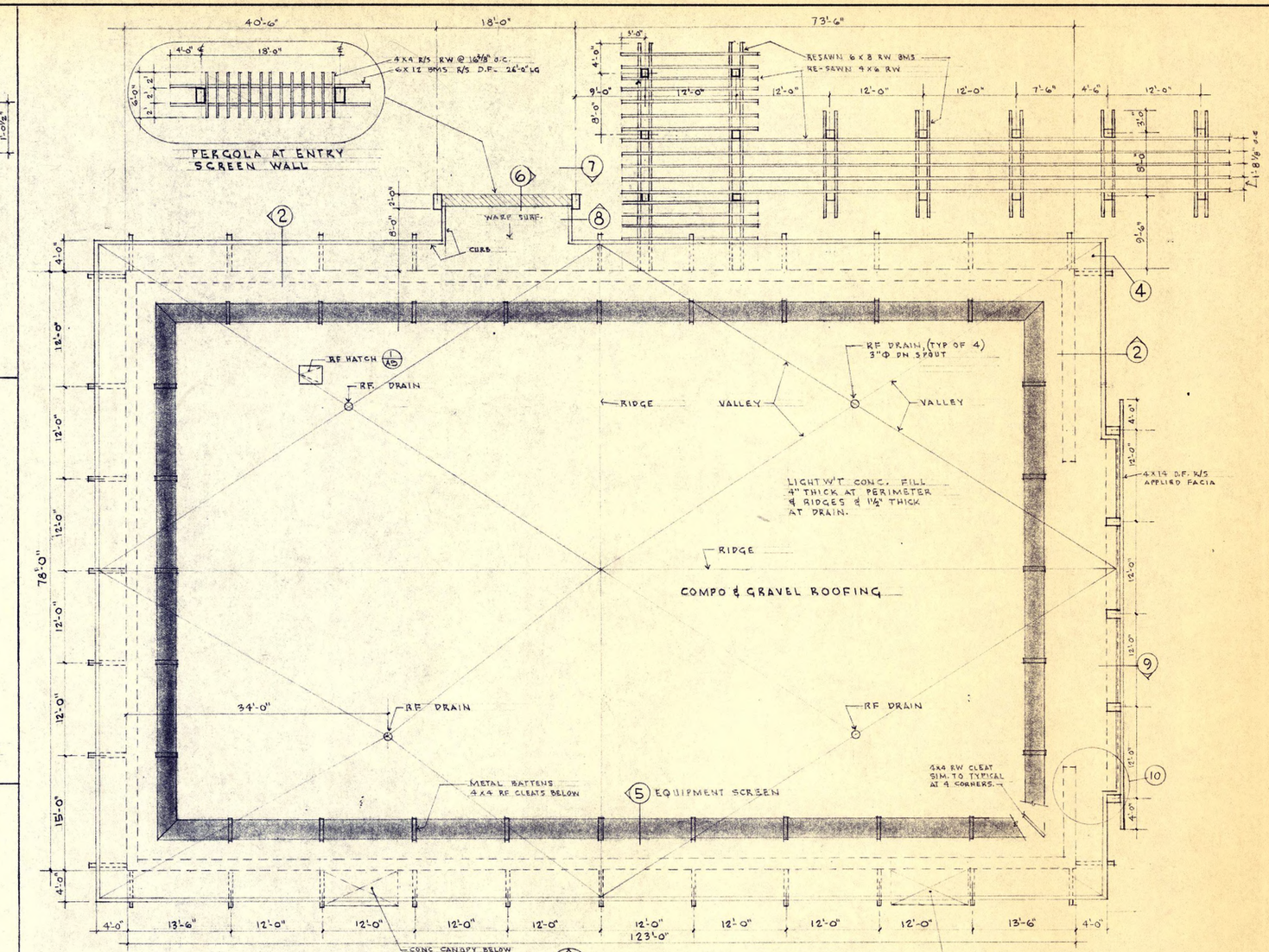
2 TYP. EAVE
3/4" = 1'-0"



3 FACIA
3" = 1'-0"

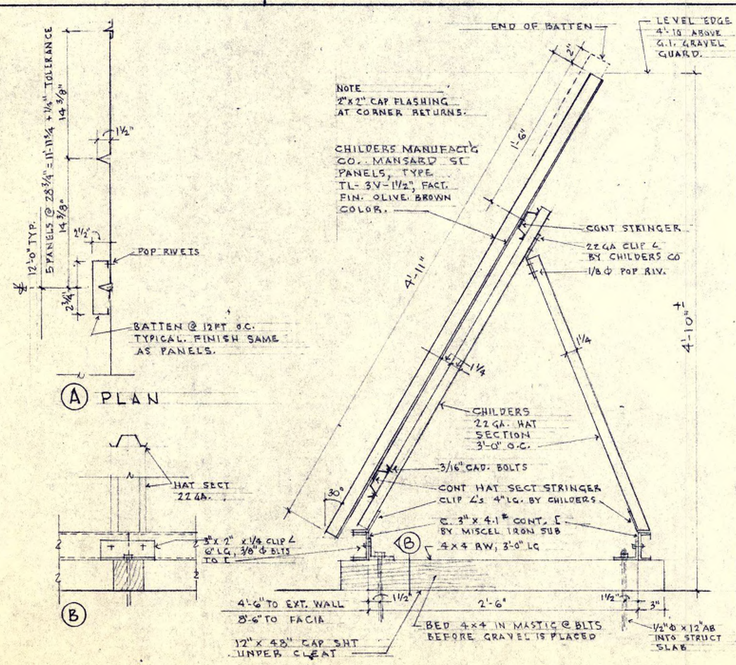


4 REFLECTED PLAN @ CORNER
3/4" = 1'-0"



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

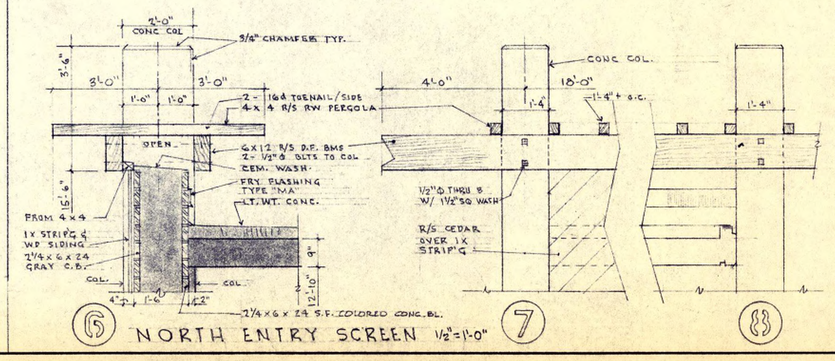
5 EQUIPMENT SCREEN



A PLAN

B

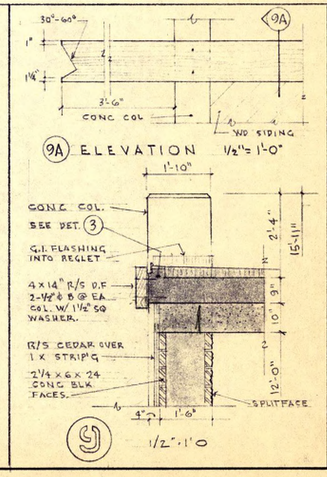
5 EQUIPMENT SCREEN
1 1/2" = 1'-0"



6 NORTH ENTRY SCREEN 1/2"=1'-0"

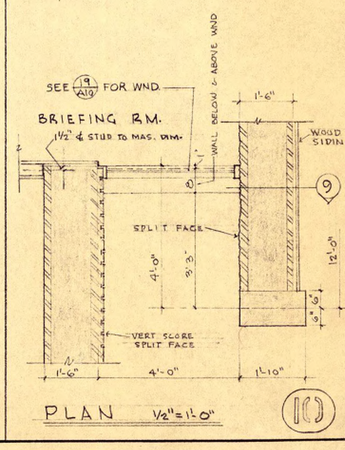
7

8



9A ELEVATION 1/2"=1'-0"

9 1/2"=1'-0"



PLAN 1/2"=1'-0"

10

CLAREMONT BLUE

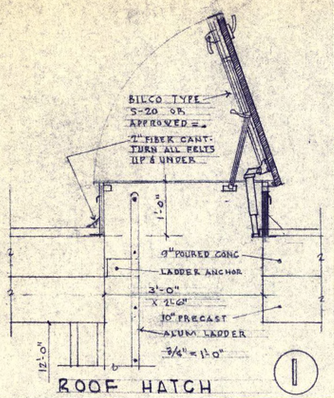
CRILEY & MC DOWELL
ARCHITECTS & ASSOCIATES
ARCHITECTURE — PLANNING
1281 N. INDIAN HILL BLVD.
CLAREMONT, CALIF. 91711
TELEPHONE (714) 624-3525

NO. | DATE | REVISIONS

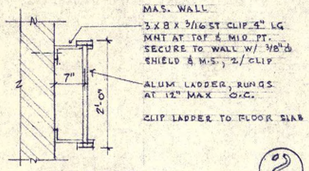
DRAWN BY | CHECKED BY

ROOF PLAN
POLICE FACILITY BUILDING
for the CITY OF CLAREMONT
570 W. BONITA AVE CLAREMONT, CALIF

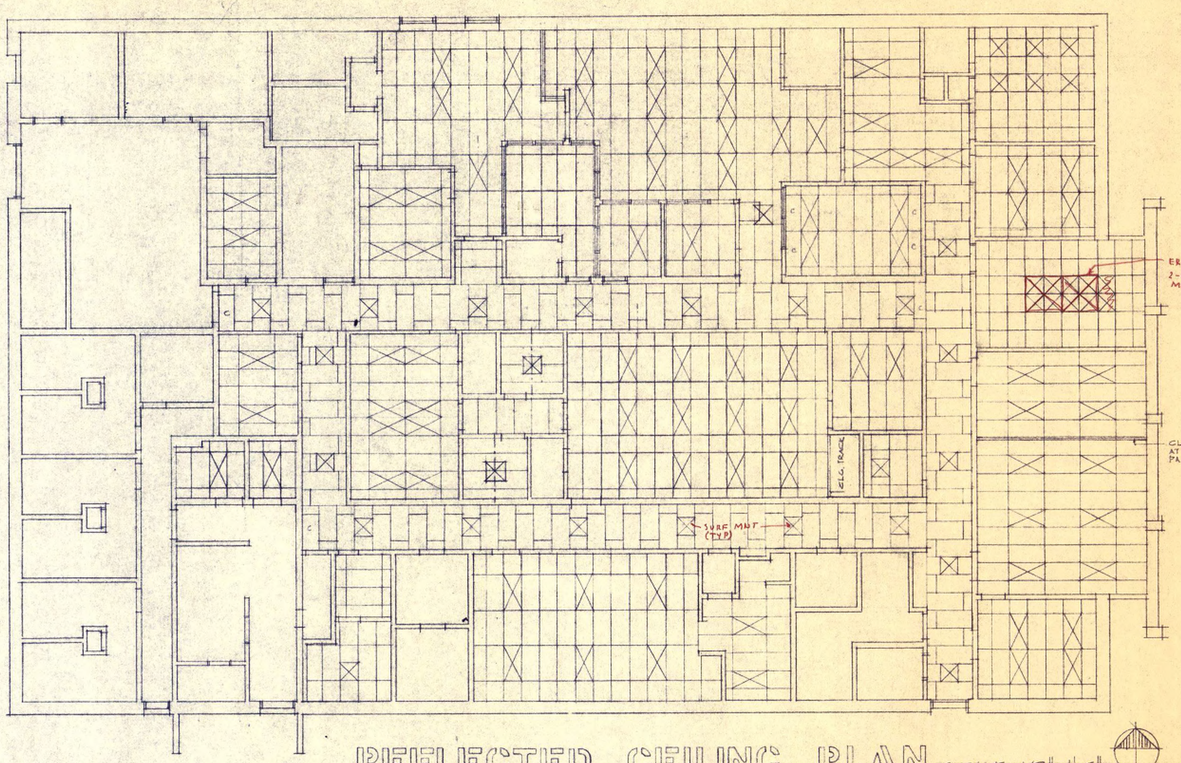
DATE 6-21-73
JOB NO. 877
SHEET NO. A8



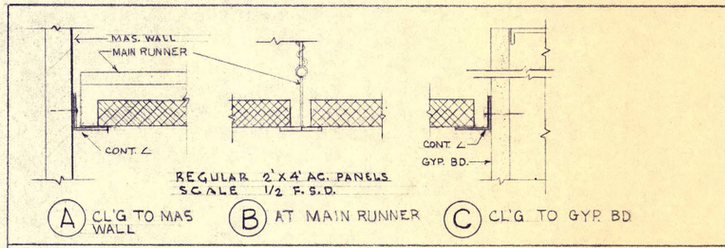
ROOF HATCH (1)

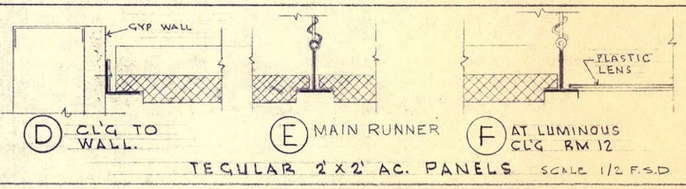


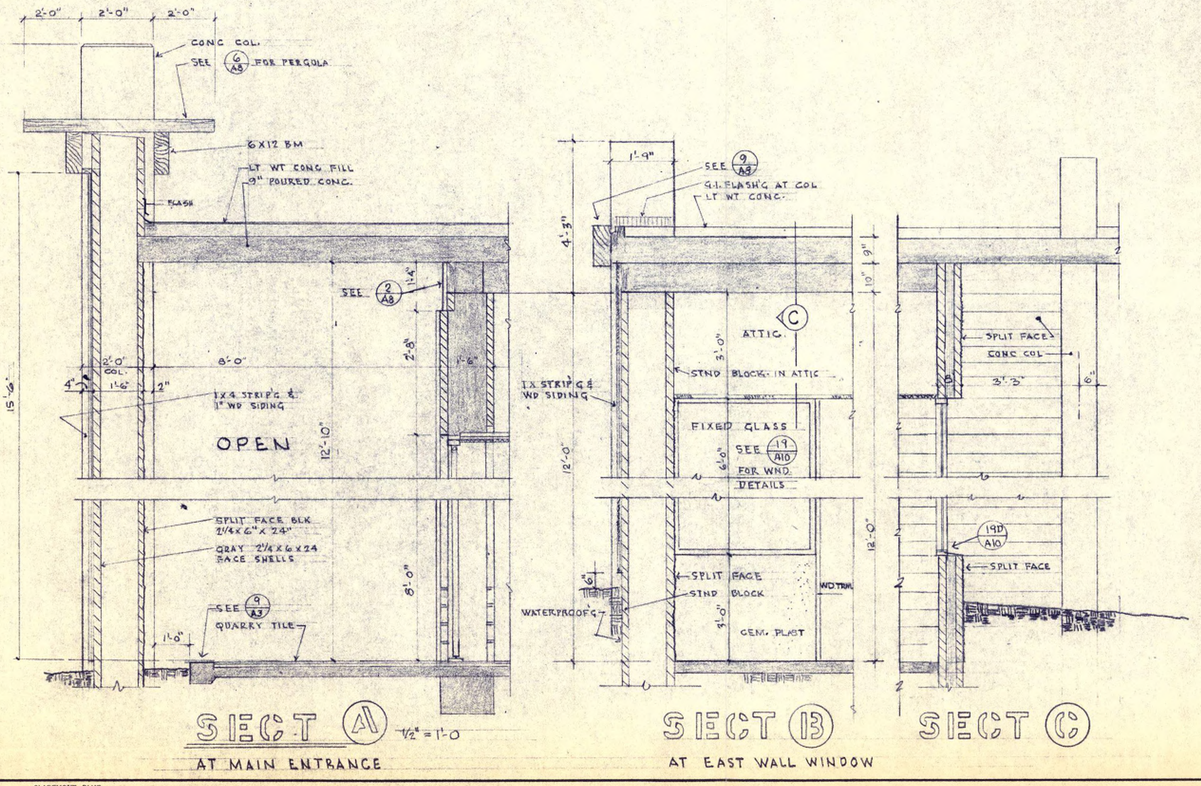
LADDER (2)



REFLECTED CEILING PLAN SCALE 1/8"=1'-0"







CLAREMONT BLUE

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NO.	DATE	REVISIONS

DRAWN BY

CHECKED BY

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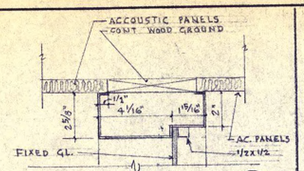
REFLECTED CEILING PLAN

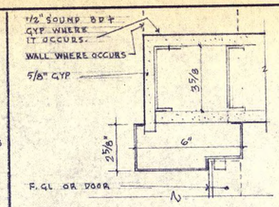
POLICE FACILITY BUILDING
for the CITY OF CLAREMONT
570 W. BONITA AVE., CLAREMONT, CALIF.

DATE 6-22-73
JOB NO. 877

SHEET NO. A9



HEAD (1)



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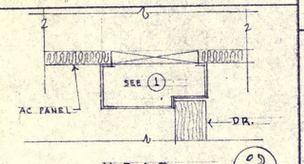

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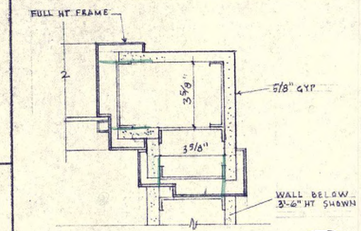

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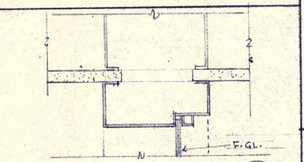
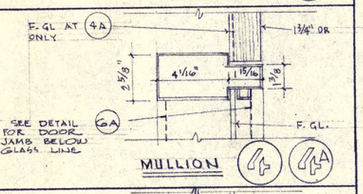
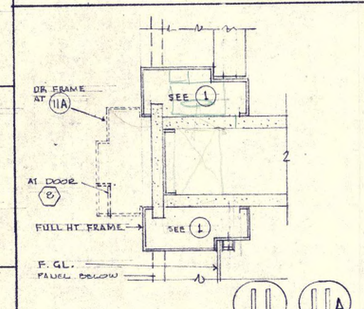


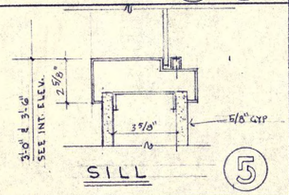
JAMB (3)



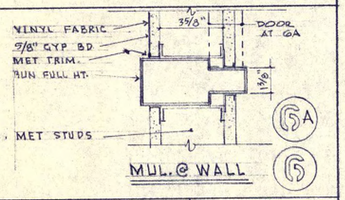
MULLION (4) (4A)



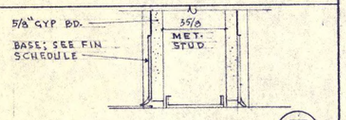
(11) (11A)



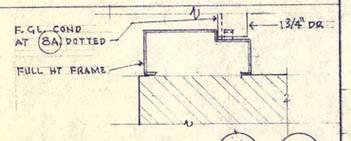
SILL (5)



MUL. @ WALL (6) (6A)



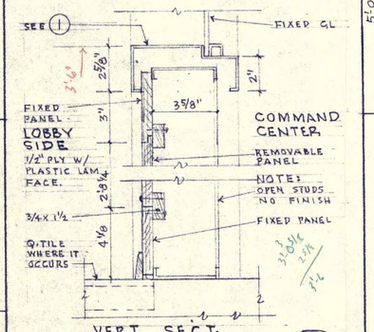
BASE (7)



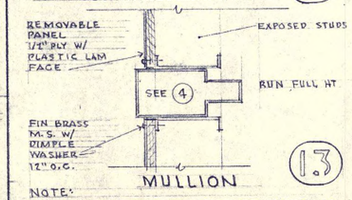
JAMB (8) (8A)

NOTE: INTERIOR STEEL WND & DOOR FRAMES SHALL HAVE ALL FRAME INTERSECTIONS WELDED & GROUND SMOOTH.

GLAZED PARTITION DETAILS 3"=1'-0"

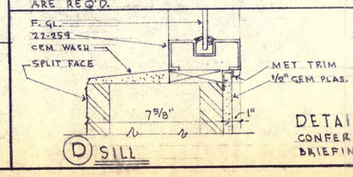


VERT SECT. REMOVABLE PANELS AT COMMAND CENTER (12)

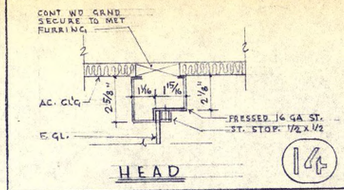


MULLION (13)

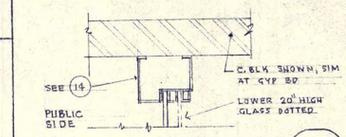
NOTE: @ REMOVABLE PANELS, BELOW THE WINDOWS AT WEST & NORTH WALL OF COMMAND CENTER ARE REQ'D.



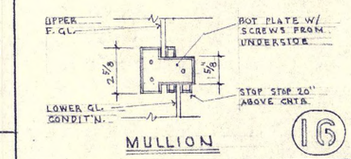
(D) SILL



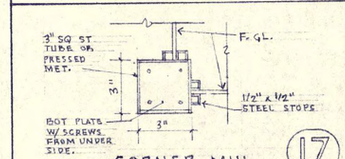
HEAD (14)



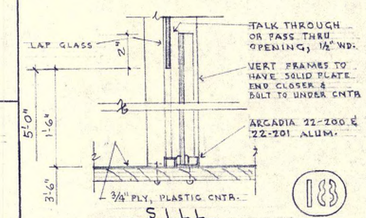
JAMB (15)



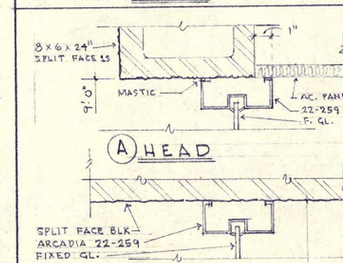
MULLION (16)



CORNER MUL. (17)

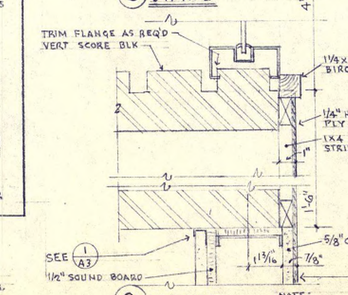


SILL (18)



(A) HEAD

(B) JAMB

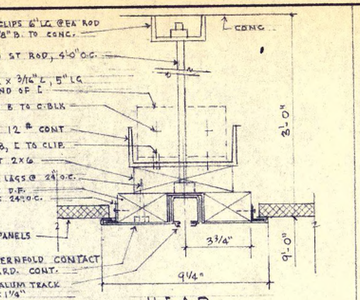


(C) JAMB

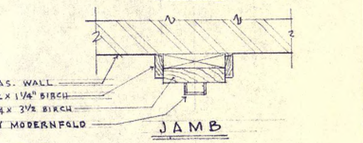
NOTE: NO WD FINISH AT BRIEFING RM.

DETAILS AT EAST WND. 3"=1'-0"
CONFERENCE RM SHOWN
BRIEFING RM. SIM. & OPP. HAND.

(19)



HEAD

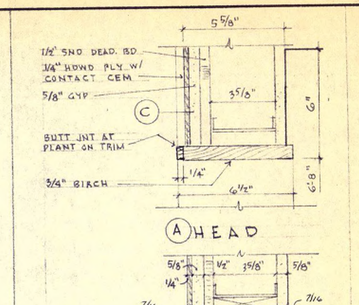


JAMB

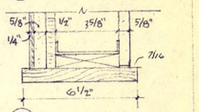
NOTES
1. GEN. CONTR. TO PROVIDE ALL STRUCTURAL FRAMING AT HEAD CONDITION & INSTALL THE METAL "CONTACT GUARD". DOOR SUB TO INSTALL C'LG TRACK
2. WOOD JAMB BY GEN. CONTRACTOR.

ACCORDION PARTITION OCCURS AT RM 13 & 14 3"=1'0

(20)



(A) HEAD



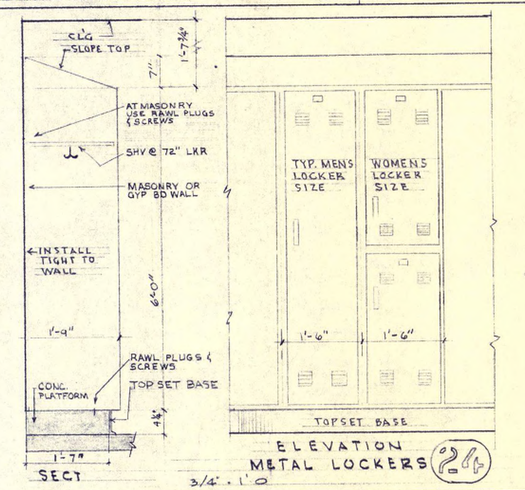
(B) JAMB

(C) PLAN AT CASING

CASED OPENING AT LOBBY 3"=1'0

(21)

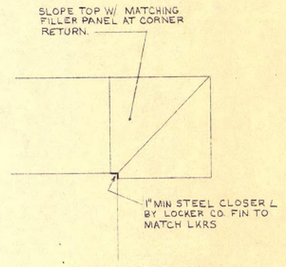
7/8 4⅛ 1¼ 5' 5/16 — 6½ 5' 5/8 7/8



SECT

ELEVATION METAL LOCKERS (24)

3/4" = 1'-0"



CORNER RETURN AT SLOPING TOP

NO.	DATE	REVISIONS

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ARCHITECTURE — PLANNING
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DRAWN BY

CHECKED BY

DETAILS

POLICE FACILITY BUILDING for the CITY OF CLAREMONT

570 W. BONITA AVE. CLAREMONT, CAL.

DATE 6-27-73

JOB NO. 877

SHEET NO. A10