CONSTRUCTION DOCUMENT
PROJECT MANUAL

Cal Poly Humboldt
Library Flat Roof Replacement

100% CD Submittal
February 6, 2023

CPH Project No. #

OWNER
The Trustees of the California State University

ARCHITECTURAL **Suarez-Kuehne Architecture** **2412 14th Avenue** **San Francisco, CA 94116** (415) 242-1400
PLUMBING **Interface Engineering** **135 Main Street #400** **San Francisco, CA 94105** (415) 489-7240
STRUCTURAL **Thornton Tomasetti** **301 Howard Street #1030** **San Francisco, CA 94105** (415) 365-6900

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PART 1 - GENERAL

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1.2 SECTION INCLUDES

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1.3 WORK INCLUDED IN THE CONTRACT

A. Work Included in the Contract: All coordination, construction, and services required for the Cal Poly Humboldt - Library - Flat Roof Replacement project located in Arcata, California including, but not limited to the following:

1. **Provide all labor, equipment and materials necessary to complete Cal Poly Humboldt Library Flat Roof Replacement including: demolition of existing roof surface, installation of insulation, new roof surface and roof traffic walk pad; adjusting and re-anchoring of existing roof vents and equipment onto raised curbs; demolition and removal of an existing generator and associated piping; removal of debris; replacement of existing roof drains and installation of additional overflow roof drains, sensors and notification system and associated plumbing and electrical services; removal, patching and installation of cementitious plaster walls; painting of walls and exposed piping; design and installation of a fall protection roof anchorage system as described within the drawings and technical documents and other information included herein.**
2. **Contractor shall be responsible to protect adjacent areas and furniture from dust, smells, and noise pollution resulting from construction activities, using a method that meets University approval prior to installation.**
3. **Contractor shall be responsible to field verify all dimensions.**
4. **Contractor shall access the area of construction only through those entries designated within the Construction & Laydown Area Map. Should operations require access via other entries, such shall be coordinated and authorized, in advance, with the University's Project Manager.**
5. Additional information concerning the Project is provided in this complementary set of contract documents.

1.4 PERMITS, LICENSES AND FEES

A. Permits, Licenses and Fees, General: Refer to Contract General Conditions, Article 4.11. Also see Section 01 41 00 Regulatory Requirements for applicable codes, regulations, and ordinances, as well as responsibilities for fees of authorities having jurisdiction.

B. Licenses: Contractor shall obtain and pay all licenses associated with construction activities, such as business licenses, contractors' licenses and vehicle and equipment licenses. All costs for licenses shall be included in the Contract Amount.

C. Parking Fees: Contractor shall obtain and pay for all parking permits and fees for vehicles parked off of the Construction Site. Refer to Section 01 55 00 Vehicular Access and Parking for additional parking requirements during construction.

D. Permits, Notices and Fees for Work under Separate Contracts: Notices required by and approvals required of, authorities having jurisdiction over work under separate contracts and related fees, will be solely the responsibility of University.

1.5 CONTRACT TIME

A. Total Completion: Refer to Bid Proposal Form for the number of Days from the start date established by the Notice to Proceed.
   1. Complete all Work including all administrative and contract closeout requirements for the Cal Poly Humboldt - Library - Flat Roof Replacement project. This Contract Time includes all inspections and approvals as well as the Deputy Building Official approval and SFM Certificate of Conditional Occupancy.
   2. See Contract General Conditions, including Article 4.15 for Contract Time requirements.
   3. The Contractor shall not have the right to an adjustment in the time of completion due to weather conditions or industrial conditions which are normal for the locality of the site. The time for completion of the Contract has been calculated with consideration given to the average climatic range and usual industrial conditions prevailing in the locality of the site.

1.6 LIQUIDATED DAMAGES

A. The Contractor shall be responsible for $500 per Day beyond the Contract Time that the project is has not met Total Completion.
   1. See Contract General Conditions, including Article 7.02 for Liquidated Damages information.

1.3 PARTNERING

A. The University intends to encourage the foundation of a cohesive partnership with the Contractor and its Subcontractors, the Architect and its consultants, and the University. This partnership will be structured to draw on the strengths of each organization to identify and achieve reciprocal goals. The objectives are effective and efficient Contractor performance, intended to achieve completion within budget, on schedule, and in accordance with the Contract Drawings and Specifications.

1.4 JOB SUPERINTENDANT & PROJECT MANAGER

A. The following requirements are in addition to the requirements of the Contract General Conditions:
   1. The Contractor shall employ a competent Superintendent able to read, write and communicate fluently in English. The Superintendent shall be on site at all times during which work occurs on the project site and shall be fully authorized to represent Contractor in all matters pertaining to the work of this contract. All communications and agreements with the Superintendent shall be binding upon Contractor. The Superintendent shall be acceptable to the University and shall continue in the capacity of Superintendent for the

duration of the project unless the Superintendent ceases employment with Contractor or the University otherwise agrees. The Superintendent shall not be employed on any other project by the Contractor during the course of this project.

2. Work shall not occur on the site except under the direct supervision of the Superintendent. Failure to maintain a Superintendent on the Project site at all times that work is occurring will result in the issuance of a stop work notice by the University Representative. Any schedule impact resulting from said stop work order shall be the responsibility of the Contractor; no additional costs for delay will be due Contractor, nor will assessment of liquidated damages be suspended to account for the work stoppage.
3. In addition to the Superintendent, Contractor shall assign a full-time project manager solely dedicated to the work of this project for the duration of the project.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 03 00: BID ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements and descriptions for products and scopes of Work identified as “Alternate, Alternative, Bid Alternate, Add Alternate, or Deduct Alternate” in the Drawings, Specifications, and Bid Proposal Form.

1.3 GENERAL REQUIREMENTS FOR ALTERNATES

A. To enable University to compare total costs where Alternate materials and methods might be used or where scope of Work might be altered, Bid Alternate Work items have been established as described in this Section.
   1. Unless otherwise specifically provided, the work described in Alternates shall be completed with no increase in Contract Time.
   2. The lowest bid for this public works contract shall be based on the Base Bid price without consideration of the prices on the Alternates. (PCC 10780.5(a))

B. Contract Amount included in Base Bid and as stated in executed Agreement shall include all costs for Work described in Contract Documents.

C. Contract Amount shall include all necessary provisions for Work described in Alternates, whether or not Alternates are accepted. Base Bid specifications shall govern Work of Alternates unless otherwise specified.

D. Bid Proposal Form or other means prescribed for submission of proposed cost of Work shall include line items for each Alternate described in this Section. No Alternates other than as described in this Section shall be submitted, except in accordance with product options and substitutions provisions specified in Section 01 61 00 - Product Requirements.

E. Each Alternate is identified herein by number. This identification shall be used whenever referring to Work described in Alternate and in cost proposals and payment requests.

F. Alternate construction described in Alternates and revised scopes of Work shall be performed only when such Alternate is made a part of the Work by specific provision in the Agreement, if selected by University prior to execution of the Agreement, or by Change Order or Change Directive if selected subsequent to execution of the Agreement.

G. Costs for Alternates shall be valid for no less than 45 calendar days from date of Agreement execution, and University may select any or all Alternates during that time. Once an Alternate is selected and the Contract modified for Work as described in the Alternate, changes to return to original scope of Work will be made only by Change Order

or Change Directive in accordance with provisions of the Contract General Conditions for changes.

1.4 PRODUCTS AND EXECUTION

A. If University elects to proceed on the basis of one or more of the described Alternates, Contractor shall make all modifications to Work as required to provide products complete, in place and fully functional, including all labor, equipment, services and incidental consumables necessary to apply, install and finish Work described in Alternate in accordance with requirements specified in related product Sections of these Specifications.

B. Cost for Alternates shall be complete and include all net increases and decreases in Contract Amount for Work described in Alternate and for all changes in related Work.

1.5 SCHEDULE OF ALTERNATES

1. Library – Flat Roof Replacement Additive Alternate No. 1 – **(TBD)**
   A. Base Bid Item: **(TBD)** Scope is to be included in the base bid unless otherwise noted (see drawings).

   B. Alternate Item: Base Bid plus **(TBD)** Scope is to be added as an Additive Alternate unless otherwise noted (see drawings).

2. Library – Flat Roof Replacement Additive Alternate No. 2 – **(TBD)**
   A. Base Bid Item: **(TBD)** Scope is to be included in the base bid unless otherwise noted (see drawings).

   B. Alternate Item: Base Bid plus **(TBD)** Scope is to be added as an Additive Alternate unless otherwise noted (see drawings).

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 14 00: WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Contractor's Use of Premises and Site, General
B. University's Use of Premises and Site, General
C. Keys to University Facilities
D. Working Hours
E. Noise and Vibration Restrictions
F. Smoking
G. Site Decorum
H. Notification Required by CA Penal Code 290
I. Cultural Resources

1.3 CONTRACTOR'S USE OF PREMISES AND SITE, GENERAL

A. Contractor shall at all times perform Work so as to impose no hardship on the University or others engaged in the University' work under other Contracts nor cause unreasonable delays or hindrance thereto.
B. Construction activities shall be scheduled to minimize disruption to the University and to Campus users.
C. Contractor may not interrupt any Campus utilities without prior written permission from the University. Refer to Section 01 51 00 Temporary Utilities.
D. Refer to Section 01 52 00 Construction Area and Temporary Facilities for specific requirements and restrictions related to the Contractor's use of the Project Area.
E. Refer to Section 01 55 00 Vehicular Access and Parking for specific requirements related to access routes and parking permit requirements.

1.3 UNIVERSITY'S USE OF SITE AND PREMISES

A. University's Use of Site and Premises: University reserves the right to occupy and to place and install equipment in completed or partially completed areas of buildings and site. Such placing of equipment and partial occupancy shall not constitute acceptance of total Work.
B. Full University Occupancy: University will occupy adjacent site and adjacent existing building during entire construction period. Cooperate with University during construction operations to minimize conflicts and facilitate University usage. Perform the Work so as not to interfere with University's operations.
C. Before partial University occupancy, mechanical and electrical systems shall be fully operational, and required tests and inspections shall be successfully completed. Unless otherwise agreed, University will provide operation and maintenance of mechanical and electrical systems in portions of the building used by University. Unless otherwise agreed in

writing by the University, warrantee periods shall not begin until date established by Notice of Completion filed at Contract closeout.

D. Upon occupancy, University will assume responsibility for maintenance and custodial service for occupied portions of building.

1.4 KEYS TO UNIVERSITY FACILITIES

A. Submit Key Requests: Access to University facilities shall be requested in writing, reasonably in advance of the period of the desired access. Contractor shall indicate the justification for the access, individuals to be granted access and the specific period of access requested.

B. The University maintains the right to deny key request where it is determined that the Work may be completed without key being issued, or where Contractor fails to comply with any key related policy or procedure. By accepting any issued keys, such acceptance constitutes Contractors agreement to all policies and requirements. A signature may also be required. Upon completion of the Work, Contractor shall return all University-issued keys to the University. If the Contractor fails to return all keys issued, the Contractor shall be liable for the total cost of labor and materials to re-key all areas accessible with the lost keys. Lost or stolen keys shall be reported immediately to the University Police Department. The Contractor may not make duplicate keys.

1.4 WORKING HOURS

A. Normal Work Hours: Contractor's Work shall usually be limited to Monday through Friday, during hours of 7:00am to 5:00pm.

1. Work on other days and at other hours than those listed above shall be only with written approval of University's Representative and such Work shall be performed at no additional Contract Time or Contract Sum. The following three items are examples where this may be required:
    a. Where it is determined necessary to perform Work outside of normal hours or days in order for the Contractor to avoid conflicts with the University's other campus activities and facilities.
    b. Work during final exam periods shall be restricted to minimize noise, vibrations and other distracting and inhibiting activities. Consult University calendar for dates and show on Construction Schedule in accordance with Section 01 32 00.
    c. If the Contractor determines that it is necessary to perform Work during additional hours, or for weekends and holidays, in order to meet milestone and final completion dates. Note that inspections may not be available outside of normal working hours.

1.5 NOISE AND VIBRATION RESTRICTIONS

A. Comply with the provisions of General Conditions 4.03.c, which requires the Contractor to comply with all sound control and noise level rules, regulations, and ordinances. The following more detailed requirements shall be considered as rules for all Work as part of this project. Perform all work in a manner that will produce a noise level not to exceed 80 dBA as measured at 50 feet from the project site boundary unless otherwise indicated. During finals week at the end of each semester, the noise level shall not exceed 75 dBA as

measured at 50 feet from source. The Contractor shall instruct all workers in noise control procedures. These rules shall be in addition to any worker safety requirements in accordance with any occupational safety regulations.

B. Equipment: Equip jack hammers with exhaust mufflers and steel muffling sleeves. Air compressors should be of a quiet type such as a "whisperized" compressor. Compressor hoods shall be closed while equipment is in operation. Use electrically powered rather than gasoline or diesel powered fork lifts. Provide portable noise barriers around jack hammering.

C. Operations: Keep noisy equipment as far as possible from noise sensitive site acitivities. Machines shall not be left idling. Use electric power in lieu of internal combustion engine where possible. Maintain equipment properly to reduce noise from excessive vibration, faulty mufflers, or other sources. All engines shall have properly functioning mufflers.

D. Scheduling: Schedule noisy operations so as to minimize their duration at any given location, and to minimize disruption to the adjoining users. Notify the University in writing not less than 7 days in advance of performing work creating noise in excess of that specified in Paragraph A, and schedule such work at times mutually agreeable.

E. Cooperate with the University if the use of noisy equipment becomes objectionable. The University reserve the right, at their own discretion, to require a limitation on the use of such equipment to designated hours appropriate to each location.

E. Do not play radios, music players, televisions, and other similar items at construction site. Workers shall not yell or shout as a means of communication.

1.7 SMOKING

A. Contractor’s personnel shall adhere to the University smoking policy while on campus. Contractor’s Work Areas shall not be used for smoking. Only approved designated smoking areas may be utilized. The full University Smoking Policy, and a map to Designated Smoking Areas is available at the following address: http://www2.humboldt.edu/smoking/

1.8 SITE DECORUM

A. Control the conduct of Contractor’s forces and prevent unwanted interaction initiated by workers with the University staff, students or visitors other than those directly associated with the project.

B. In the event that any worker initiates unwanted interaction, utilizes profanity, or (in the opinion of the University) conducts him/herself in an offensive or unprofessional manner, immediately remove the worker from the project and replace said worker with another of equivalent technical skill at no additional cost to the University.

1.9 NOTIFICATIONS REQUIRED BY CA PENAL CODE 290

A. Contractor shall advise all of its personnel working on campus, that if they are required to register under California Penal Code Section 290 Sex Offender Registration Act, that they shall report that status to the Humboldt State University Police Department, where required.

1.10 CULTURAL RESOURCES

A. Cultural Resources Procedures: Requirements specified in this Section are in addition to those required by Article 4.03 of the Contract General Conditions.

B. This Project does not pass through any known archaeological sites. However, it is conceivable that unrecorded archaeological sites could be discovered during construction.

C. In the event that artifacts, human remains, or other cultural resources are discovered during subsurface excavations at locations of the Work, the Contractor shall protect the discovered items, cease work for a distance of 35 feet radius in the area, notify the University Representative, and comply with applicable laws.

D. University may retain an Archaeologist or other appropriately qualified persons to monitor and recover data and artifacts during period that work has ceased.

E. All items found which are considered to have archaeological significance are the property of the University.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 26 13: REQUESTS FOR INTERPRETATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Procedures for submitting requests for interpretation (RFI).
B. Limitations on use of RFI to obtain interpretation and clarification.

1.3 RELATED SECTIONS

A. Section 01 31 00 – Project Coordination: Requirements for organizing and coordinating the Work.
B. Section 01 33 00 - Submittals Procedures: Restriction on use of submittals for changes in materials, products, equipment and systems.
C. Section 01 63 00 - Product Substitution Procedures: Procedures for requesting substitutions of materials, products, equipment and systems.

1.4 DEFINITIONS

A. Request for Interpretation: A document submitted by the Contractor requesting clarification of a portion of the Contract Documents, hereinafter referred to as an RFI.

1.5 CONTRACTOR'S REQUESTS FOR INTERPRETATION (RFIs)

A. Contractor's Requests for Interpretation (RFIs): Should Contractor be unable to determine from the Contract Documents the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of Work is described differently at more than one place in the Contract Documents; the Contractor shall request that the University or Architect make an interpretation of the requirements of the Contract Documents to resolve such matters. Contractor shall comply with procedures specified herein to make Requests for Interpretation (RFIs).

B. Submission of RFIs:
   1. RFIs shall be issued from the General Contractor to the University Project Representative in electronic format by email, as an attached PDF file. Wherever possible, the RFI will be bound into a single PDF file, with the transmittal letter as the first page, followed by the remaining contents.
   2. Each RFI shall be given a discrete, consecutive number.
   3. RFIs shall be prepared and submitted on a template provided by the University.
   4. Contractor shall sign all RFIs attesting to good faith effort to determine from the Contract Documents the information requested for interpretation. Frivolous RFIs shall be subject to reimbursement from Contractor to University for fees charged by Architect, Architect's consultants and other design professionals engaged by the University.

C. Subcontractor-Initiated and Supplier-Initiated RFIs: RFIs from subcontractors and material suppliers shall be submitted through, be reviewed by and be attached to an RFI prepared, signed and submitted by Contractor. RFIs submitted directly by subcontractors or material suppliers will be

returned unanswered to the Contractor.

1. Contractor shall review all subcontractor- and supplier-initiated RFIs and take actions to resolve issues of coordination, sequencing and layout of the Work.
2. RFIs submitted to request clarification of issues related to means, methods, techniques and sequences of construction or for establishing trade jurisdictions and scopes of subcontracts will be returned without interpretation. Such issues are solely the Contractor's responsibility.
3. Contractor shall be responsible for delays resulting from the necessity to resubmit an RFI due to insufficient or incorrect information presented in the RFI.

D. Requested Information: Contractor shall carefully study the Contract Documents, in particular, Article 5 of the Contract General Conditions, to ensure that information sufficient for interpretation of requirements of the Contract Documents is not included. RFIs that request interpretation of requirements clearly indicated in the Contract Documents will be returned without interpretation.

1. In all cases in which RFIs are issued to request clarification of issues related to means, methods, techniques and sequences of construction, for example, pipe and duct routing, clearances, specific locations of Work shown diagrammatically, apparent interferences and similar items, the Contractor shall furnish all information required for the Architect or University's Representative to analyze and/or understand the circumstances causing the RFI and prepare a clarification or direction as to how the Contractor shall proceed. This may include coordination drawings to be prepared by the Contractor, even when not specified as a required submittal.
2. If information included with this type RFI by the Contractor is insufficient, the RFI will be returned unanswered.

E. Unacceptable Uses for RFIs: RFIs shall not be used to request the following:
1. Approval of submittals (use procedure specified in Section 01 33 00 - Submittals Procedures)
2. Approval of substitutions (refer to Section 01 63 00 - Product Substitution Procedures)
3. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Contract General Conditions, as discussed in detail during pre-construction meeting)
4. Different methods of performing Work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Contract General Conditions).

F. Disputed Requirements: In the event the Contractor believes that a clarification by the University's Representative results in additional cost or time, Contractor shall comply with Article 5 of the Contract General Conditions.

G. RFI Log: Contractor shall prepare and maintain a log of RFIs, which shall be reviewed at each Construction Progress Meeting in accordance with Section 01 31 20 Project Meetings.

H. Distribution of RFI's: The University Representative will forward RFI's to the project Architect and will manage and be included in all communications among Contractor and Architect, where necessary. The University will issue all official RFI responses back to the Contractor.

I. RFI Processing Time: See Contract General Conditions and Supplementary General Conditions for additional requirements. No extension of Contract Time will be authorized because of failure to transmit complete and appropriate RFI to the University sufficiently in advance of the Work. University will return RFIs to Contractor with reasonable promptness.

PART 2 – PRODUCTS (Not Used)
PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 31 00: PROJECT COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Coordination of Work under Contract.

1.3 RELATED SECTIONS

A. Section 01 01 00 - Summary of Work: Overall Project description including various types of Work to be coordinated.

B. Section 01 60 00 - Product Requirements: Coordination of products, especially general requirements for system completeness and product substitutions.

C. Section 01 64 00 Owner-Furnished Products: Related requirements and responsibilities.

1.4 PROJECT COORDINATION

A. General:

1. Coordinate the Work according to provisions stated in Contract General Conditions. Do not delegate responsibility for coordination to any subcontractor.
    a. Anticipate the interrelationship of all subcontractors and the total work.
    b. Resolve differences or disputes between subcontractors and materials suppliers concerning coordination, interference, or extent of work between sections. The Contractor's decisions, if consistent with the Contract Documents, shall be final. The Architect is not required to coordinate work between sections.
    c. Coordinate the work of subcontractors and material suppliers, so that their work is performed in a manner to minimize interference and facilitate progress of the work.

2. Coordinate utility and building services shut-downs and closures of vehicular and pedestrian thoroughfares, including access to buildings and parking areas, to minimize disruption of University activities.

3. Provide anchorage, blocking, and other connections as required for a complete project.

4. Do not obstruct spaces required by Code in front of electrical equipment, access doors, etc. Do not cover any piping, wiring, ducts, etc., until properly inspected and approved.

5. Remove and replace any and all Work under any Section which is not in accordance with the Contract Documents. Repair or replace all Work damaged by these operations at no increase in contract price or contract time.

B. Relationship of Contract Documents: Drawings, Specifications and other Contract Documents in the Project Manual are intended to be complementary. What is required by one shall be as if

required by all. What is shown or required, or may be reasonably inferred to be required, or which is usually and customarily provided for similar work, shall be included in the Work.

C. Discrepancies in Contract Documents: In the event of error, omission, ambiguity or conflict in Drawings or Specifications, Contractor shall bring the matter to attention of the University in a timely manner during the bidding period, for determination and direction by the Architect in accordance with provisions of the Contract General Conditions.

B. Construction Interfacing and Coordination: Layout, scheduling and sequencing of Work shall be solely the Contractor's responsibility. Contractor shall verify, confirm and coordinate field measurements so that new construction correctly and accurately interfaces with conditions existing prior to construction.

1.5 SUPERINDENDENCE OF THE WORK

A. Superintendence of Work: Contractor shall appoint a field superintendent and project manager, who shall directly and full time supervise and coordinate all Work of the Contract.

B. Subcontractors, Trades and Materials Suppliers: Contractor shall require all subcontractors, trades, crafts and suppliers to coordinate their portions of Work with the Contractor's field superintendent to prevent scheduling, sequencing, dimensional and other conflicts and omissions.

1.6 CONCURRENT WORK UNDER SEPARATE CONTRACTS

C. Work Under Separate Contracts: University may award separate design and construction contracts concurrent with this Contract and in the future, as determined by the University. Such work under separate contracts may be indicated on the Drawings and in the Specifications as "Not in Contract", "NIC", "Future" or "Under Separate Contract".

D. Relationship to Work Under the Contract: Work under the Contract shall include all provisions necessary to make such concurrent work under separate contracts complete in every respect and fully functional, including field finishing. Provide necessary backing, supports, piping, conduit, conductors and other such provisions from point of service to point of connection, as shown on Drawings and specified herein.

C. Documents for Work Under Separate Contracts: University's Representative will make available, in a timely manner, drawings and specifications of work under separate contracts for coordination and further description of that work.

1. If available, such information will include drawings, specifications, product data, lists and construction schedules for such work.
2. Information concerning work under separate contracts or directly by University will be provided for convenience only and shall not to be considered Contract Documents.

1.6 SUBMITTALS

A. Coordination Documents: Coordinate shop drawings, diagrams and other specified in various product Sections of the Contract Specifications. Submit coordination drawings and schedules as specified below, prior to submitting shop drawings, product data, and samples.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 COORDINATION REQUIRED

A Coordinate progress schedules, including dates for submittals and for delivery of products.

B. Conduct meetings with suppliers, installers and others concerned with the Work, to establish and maintain coordination of layout, sequencing and completion of various elements of Work.

C. Conduct meetings with installers and others concerned with the Work, to properly integrate various mechanical and electrical systems, to facilitate construction and to provide proper access and work space for maintenance, renovation and improvement of system components. Include participation by representatives of University, including maintenance personnel.

D. Resolve conflicts by providing technical advice, coordination drawings and three dimensional representations of integrated system components.

E. At construction progress meetings, report on progress of Work to be adjusted under coordination requirements and any necessary changes in sequencing and scheduling of Work.

F. Transmit minutes of coordination meetings and reports to University's Representative, Architect, Architect's consultants (as applicable) and to meeting participants.

3.2 COORDINATION DOCUMENTS

A. Coordination Drawings and Models: Contractor shall prepare coordination drawings and three-dimensional models, in computer form and in physical form as necessary, to organize layout and installation of mechanical and electrical products for efficient use of available space, for proper sequence of installation, for integration with building structure, for future maintenance and renovation, and to identify potential conflicts between systems and elements.

B. System Services: Contractor shall identify on coordination drawings and models all plumbing and electrical power and signal services required for each component of each system.

1. Contractor shall certify that characteristics of services and controls are correct for each component.

2. Certification shall be in written form and signed by Contractor and mechanical and electrical coordinator.

C. Responsibility and Services Matrix: Contractor shall prepare schedule a matrix identifying elements of mechanical and electrical Work requiring coordination, as specified in each Section in Divisions 1 through 16 of the Contract Specifications.

1. Include identification of parties having responsibilities related to each element of Work and describe what that responsibility shall be.

2. Include required off-site and on-site tests and inspections for various elements of Work.

3. Include identification of administrative activities related to each element of mechanical and electrical Work, such as product data, shop drawings, coordination drawings, samples,

mock-ups, test reports for each element of Work.

4. Include identification of elements of Work requiring temporary services.

D. Maintenance and Disposition of Coordination Documentation: Maintain coordination documents, including models, for duration of the Work, recording all changes. After review of original and revised documents and models by University's Representative and Architect, submit documents and models as part of Project record documents.

3.3 COORDINATION OF SUBMITTALS

A. Coordinate the review and processing procedures of all submittals in accordance with Section 01 33 00 - Submittals Procedures

3.4 COORDINATION OF SUBSTITUTIONS AND MODIFICATIONS

A. Coordinate the review and processing procedures of all proposed product substitutions in accordance with Section 01 63 00 - Product Substitution Procedures.

3.5 SYSTEM AND EQUIPMENT START-UP

A. Observations of System and Equipment Activation and Start-Up: Contractor shall observe activation and start-up of systems and equipment, including all Work with connections to utilities, building services and controls and verify that utilities, building services and control systems are properly connected, complete and functional within criteria of manufacturer and criteria indicated in the Contract Documents.

B. Observations of System and Equipment Demonstrations: Contractor shall observe performance demonstrations including equipment demonstrations to Architect and University's Representative. Record times and additional information required for operation and maintenance manuals.

C. Documentation of Observations of Activation, Start-Up, Adjustment and Demonstration: Contractor shall keep written record of activation, start-up, operational tests and inspections and necessary adjustments and re-tests and re-inspections.

1. Documentation shall include record of time and date of activation, start-up, operational tests and inspections and shall include measured results of tests and inspections.

2. Documentation shall be submitted to University's Representative and Architect.

D. Prior to Contract Completion review, Contractor shall verify that each component and system has been properly adjusted, cleaned, lubricated, inspected and tested, and is ready operation and use.

END OF SECTION

SECTION 01 31 20: PROJECT MEETINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 REQUIREMENTS INCLUDED

A. Preconstruction meeting.

B. Construction progress meetings.

C. Pre-installation conferences.

1.3 PRECONSTRUCTION MEETING (CONFERENCE)

A. Preconstruction Meeting: Contractor shall administer an on-site preconstruction meeting immediately following the date established in the Notice to Proceed and prior to Contractor mobilization. Include representatives of the University, Architect, Contractor, and all subcontractors, as appropriate.

B. Agenda: Preconstruction meeting shall cover the following topics, as a minimum:

1. Special Project Procedures: Site access restrictions and requirements to avoid disruption of operations at adjoining facilities. Present University's requirements for use of premises.

2. Designation of Key Personnel: Contractor shall designate key personnel and provide a name, phone number, and address list that includes the following, at a minimum:
   a. Contractor: Project Manager and Superintendent.
   b. Subcontractors: Contact person. Include brief description of scope of work.
   c. Major materials suppliers: Contact person.
   d. University Representative Project Manager
   e. Authorities Having Jurisdiction and designated inspectors
   f. Emergency Services contacts.

3. Coordination: Review requirements for Contractor's coordination of Work. Review sequence and schedule for work being performed for University under separate contracts, if any. Discuss coordination of construction to minimize impacts on continuing Campus operations.

4. Project Communication Procedures: Review requirements and administrative requirements for written and oral communications.

5. Construction Schedule: Distribute and discuss initial construction schedule and critical work sequencing of major elements of Work, including coordination of Owner-Furnished/Contractor-Installed (OFCI) products and work under separate contracts by serving utility agencies and companies and University.

6. Security: Review requirements for Contractor to develop and implement site security.

3. Safety Program: Review requirements for Contractor to develop and implement safety program.

4. Site Access by University's Representative and Architect: Review requirements and procedures Contractor may wish to institute for identification and reporting purposes.

5. Permits and Fees: Review requirements, schedule, process, and fees for obtaining permits.

6. Project Layout: Review requirements for laying out of Work, including surveying requirements.

7. Construction Facilities: Designate storage and staging areas, construction office areas and parking areas and review site access requirements.

8. Temporary Utilities: Requirements for establishing and paying for temporary water, power, lighting and other utility services during construction, including metering and allowances.

9. Construction Progress Schedules: Review requirements for preparation and updating of construction progress and submittals schedules.

10. Payment Procedures: Review requirements for preparation and submission of applications for progress payments and for final payment.

11. Change Procedures: Review requirements and administrative procedures for Change Orders, Field Instructions and Contractor's Requests for Interpretation (RFI).

12. Submittals Administration: Review administrative procedures for shop drawings, product data and samples submittals and review of preliminary Submittals Schedule.

13. Materials and Equipment: Review substitution or equal product requirements; schedule for major equipment purchases and deliveries; review products / equipment to be provided by University.

14. Testing and Inspection: Review tests and inspections to be performed by the following:
    d. University Representatives
    b. Independent testing and inspection agency.
    c. Manufacturers and installers.
    d. Serving utilities and public agencies.
    e. Authorities having jurisdiction.

15. Operation and Maintenance Manuals: Format and content of operation and maintenance manuals.

16. Demonstration and Training: Review requirements and scheduling of instruction of University personnel specified in other sections.

17. Starting and Adjusting Procedures: Review requirements of starting and adjusting operating components.

18. Project Record Documents: Review requirements and procedures for preparing, maintaining, reviewing, and submitting project record drawings and specifications.

19. Construction Cleaning: Review requirements for progress and final cleaning.

20. Contract Closeout: Review procedures for Notice of Completion, final payment and submittals.

1.3 CONSTRUCTION PROGRESS MEETINGS

A. Construction Progress Meetings: Meetings will be held to review progress and quality of construction. The essence of the discussion of each meeting, as well as specific action items shall be entered into the written record (minutes) of the meeting by the Contractor. Each discussion item at construction progress meetings shall be numerically identified and carried through subsequent meeting minutes until resolved. Minutes shall be submitted to the University by email within two business days of the meeting for review and comment.

B. Frequency: Frequency shall be as determined necessary for progress of Work. It is intended that construction progress meetings be held at weekly intervals.

C. Administration: Contractor shall make physical arrangements for meetings and shall prepare agenda with copies for participants, preside at meetings, record and distribute minutes.

D. Attendance: Contractor's project manager and jobsite superintendent, who is qualified and authorized to act on behalf of the Contractor shall attend each meeting. Contractor's subcontractors and suppliers may attend as appropriate to subject under discussion. University's Representative will attend each meeting. The Architect may also attend some meetings, either in person or through phone or online conference.

E. Default Agenda for Each Construction Progress Meeting:

1. Meeting Minutes: Review and correct, if necessary, minutes of previous meeting. Discrepancies to minutes shall be settled prior to, or at the beginning of the next meeting.

2. Progress of the Work: Since last meeting and proposed progress.
   a. Identify potential issues which might impede progress.
   b. Develop corrective measures and procedures, including but not necessarily limited to additional workers to regain planned schedule.
   c. Review three-week "look ahead" construction schedule.

3. Ordering Status: Review status of long-lead time equipment and materials delivery.

4. RFI Status: Review status of Requests for Interpretation (RFI) status.

5. Submittals Status: Review progress of shop drawings, product data, sample submissions, and proposed substitutions.

6. Contract Modifications: Review potential Change Orders and Schedule of Values.

7. Old Business: Active discussion topics carried over from previous meetings.

8. New Business: New topics of discussion affecting construction progress and quality.

9. Quality Control: Review maintenance of quality standards and identification of non-conforming Work, including proposed remedial measures to be taken by Contractor.

10. Project Record Documents: Status of project record drawings and specifications.

11. Environmental quality, security, and safety issues.

F. Meeting Time and Location: As mutually agreed by the Contractor, and the University's Representative at on-site location.

G. Special Meetings: As necessary convene special meetings to discuss specific construction issues.

1.4 PRE-INSTALLATION CONFERENCES

A. Pre-Installation Conferences: When specified in individual product specification Sections, or where otherwise determined to be necessary in order to achieve quality finished Work, convene a pre-installation conference prior to commencing activities.

1. Require attendance by representatives of firms whose activities directly affect or are affected by Work specified in the Section.

2. Review conditions of installation, preparation and installation procedures and coordination with related Work and work under separate contracts.

1.7 CONTRACTOR'S OTHER MEETINGS

A. This Section does not limit meetings among the Contractor, subcontractors, and others as necessary.

1.8 CONTRACT COMPLETION MEETING

A. Contract Closeout Meeting: As specified in Section 01 77 00 - Contract Closeout Procedures.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

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SECTION 01 32 00: CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

0.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

0.2 SECTION INCLUDES

A. Administrative and procedural requirements for documenting the progress of construction.

0.3 RELATED SECTIONS

A. Section 01 33 00 Submittals Procedures: for general requirements for all submittals.
B. Section 01 31 20 Project Meetings: for review of schedule and daily reports.

0.4 SUBMITTALS

A. See requirements below for each of the following submittals:
   1. Contractor's Initial Construction Schedule
   2. Progress Construction Schedule
   3. Daily Construction Reports

1.02 CONTRACTOR'S INITIAL CONSTRUCTION SCHEDULE

A. Review Contract General Conditions Section 4.16 for required contents of the Contractor's Initial Construction Schedule.

B. Review the Supplementary General Conditions which modifies the due date for submittal to be due within 21 Days of Notice to Proceed.

C. Contractor's Construction Schedules shall be submitted in electronic format in compliance with the general requirements per Section 01 33 00 Submittals Procedures.

D. The Schedule Software shall be Microsoft Project (2021 or newer edition), or an approved similar. Submittals shall include both the original file in its native format as well as a PDF generated from that same file at the same saved state.

1.03 PROGRESS CONSTRUCTION SCHEDULE

A. Review the Construction Schedule at each Construction Progress Meeting.

B. Submit an updated, revised to date, Progress Schedule prior to each Application for Payment including updated Construction Schedule and narrative report per the Contract General Conditions, Section 4.16.

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1.04 DAILY CONSTRUCTION REPORTS

A. In accordance with Contract General Conditions Sections 4.08 and 4.17, the Superintendent shall prepare and submit a Daily Construction Report.

B. Contractor shall submit Daily Field Reports to the University's Project Manager no later than five work days after the date reported. This weekly submittal shall coincide with each Construction Progress Meeting. The reports shall be signed by the Contractor's on-site representative. Electronic signatures may be accepted. Some information on the Daily Construction Report may be from a Subcontractor, but it must go through and be approved by the Contractor prior to being submitted to the University.

C. Contractor's Daily Construction Reports shall include the following, at a minimum, and shall utilize the form provided by or otherwise approved by the University:
   a. Date being reported
   b. Weather conditions
   c. Quantity of each type of trade worker listed by trade and employer
   d. Subcontractors, consultants, vendors, visitors and others who have been present at the project site during the date being reported.
   e. Materials delivered to the project site.
   f. Major equipment present on the project site (i.e., lifts, material handlers, etc.).
   g. Major tasks performed cross referenced to the project schedule with notations regarding start/completion of tasks, issues or challenges encountered and impact on project schedule, inspections or tests conducted, work reviewed and its status as accepted or otherwise.
   h. Specific documentation regarding all work in dispute or being conducted under a time and materials direction by the University. Documentation must include a full and specific description of the work achieved along with specific documentation regarding the resources utilized to complete such work.
   i. Occurrence of Meetings (i.e., pre-construction, owner, coordination, safety, etc.). Minutes and attendance documentation must be submitted within 7 calendar days of said meeting.
   j. Accidents, unusual events or citations/notices received from authorities having jurisdiction or regulatory authorities.
   k. If progress, quality or conformance to the contract documents are or will be impacted, the source and extent of the impact and the specific type of work impacted.
   l. Signature of Superintendent.

END OF SECTION

SECTION 01 33 00: SUBMITTALS PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Administrative submittal procedures for shop drawings, product data, samples, tests, & inspections.

1.3 RELATED SECTIONS

A. Section 01 32 00 - Construction Progress Documentation.

B. Section 01 45 00 - Quality Control: Test and inspection reports.

C. Section 01 77 00 - Contract Closeout Procedures: Submittals for occupancy and Final Payment.

D. Section 01 78 30 - Operation and Maintenance Data: Requirements for preparation and submission of operation and maintenance data.

1.4 SUBMITTALS

A. Submittals Schedule.
   a. Contractor shall prepare and submit an Initial Submittals Schedule for review and approval by University's Representative and Architect, concurrently with the Initial Construction Schedule within **21 Days** of the start date as established in the Notice to Proceed.
   b. This Submittals Schedule will then be used to track the status of each submittal throughout construction and shall be reviewed and updated at each Construction Progress Meeting.
   c. The Submittals Schedule shall be fully coordinated and in agreement with the Construction Schedule and Schedule of Values.
   d. See the format and content requirements for the Submittals Schedule in this Section below.

1.4 DEFINITIONS

A. Submittals, Shop Drawings, Product Data and Samples: Instruments prepared and submitted by Contractor, for Contractor's benefit, to communicate to University and Architect the Contractor's understanding of the design intent, for review and comment on the conformance of the submitted information to the Contract Documents. Submittals are not Contract Documents and do not become Contract Documents by virtue of their submission, review, or stamping by the Architect or University.

B. Shop Drawings: Drawings, diagrams, schedules and illustrations, with related notes and calculations, code review, prepared for the Work of the Contract, to illustrate a portion of the Work.

C. Product Data: Standard published information and specially prepared data for the Work of the Contract, including standard illustrations, schedules, brochures, diagrams, performance charts, instructions and other information to illustrate a portion of the Work.

D. Samples: Physical examples that demonstrate the materials, finishes, features, workmanship and other characteristics of a portion of the Work. Accepted samples shall serve as quality basis for evaluating the Work.

E. Other Submittals: Technical data, test reports, calculations, surveys, certifications, special warranties and guarantees, operation and maintenance data, extra stock and other submitted information and products shall also be not be considered to Contract Documents but shall be information from Contractor to illustrate a portion of the Work for confirmation of understanding of design intent.

1.5 ADMINISTRATIVE REQUIREMENTS

A. Administrative Requirements for Submittals: Submittals shall be made in accordance with requirements specified in all Specifications. See also Article 5 of the Contract General Conditions for additional requirements especially those regarding requests for alternatives, equals, and substitutions.

B. Contractor Coordination of Submittals: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay, including necessary time for reviews by Architect and University as well as any necessary revisions and resubmittal review periods. Some submittals may also require review by Authorities Having Jurisdiction. See procedures for such Deferred Submittals, where applicable.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.

2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
   a. The University will return without action submittals requiring coordination with other submittals until related submittals are coordinated.

C. Submittals Schedule: Submittals Schedule shall be formatted in electronic Microsoft Excel as suitable for the specific Project. The format and content shall be subject to acceptance by University, or where provided, Contractor shall utilize the form template provided directly by the University. The Submittals Schedule shall include, at a minimum, the following information:
   1. Specification Section Number that the item is most closely related to.
   2. A space for final sequential Submittal Number
   3. Name of the submittal
   4. Whether the Submittal is for Review or for Information
   5. Indication of the Type of Submittal, with additional description as applicable:
      a. Shop Drawings & Calculations
      b. Product Data
      c. Samples
      d. Color Samples
      e. Mock Ups
      f. Test Reports
      g. Information or Coordination Item
      h. Installation Instructions
      i. Operation and Maintenance Manuals
      j. Warranties and/or Guarantees
      k. Laboratory Reports
      l. Other Submittals

6. Scheduled date for first submittal, followed by a space for recording the actual date the submittal was transmitted.
7. Scheduled date for resubmittals, followed by a space for recording the actual date the resubmittal was transmitted.
8. Scheduled date when Architect & University's final release or approval is necessary to be returned to the Contractor in order to not cause delay to the Work.
9. Scheduled date by which material or equipment must be on site in order to not cause delay to the Work.
10. Identify items which are potentially critical path or long lead items for ordering.
11. Identify other items or submittals which require specific coordination.

D. Submission of Submittals:

1. General: Submittals shall be issued from the General Contractor to the University Project Representative in electronic format by email, as an attached PDF file. Wherever possible, the submittal will be bound into a single PDF file, with the transmittal cover letter as the first page, followed by the remaining contents. The file name for the submittal shall be as specified below. Where necessary, an additional physical submittal may be necessary, and shall be submitted as noted below.
    a. File name examples:
        i. ProjectName_074113_MetalRoofPanels_ProductData.pdf
            1. Initial submittal for Metal Roof Panel product data.
        ii. ProjectName_074113-Rev1_MetalRoofPanels_ProductData.pdf
            1. First revised submittal for Metal Roof Panel product data.

2. Physical submittals: Where the content or type of submittal includes one or more items of distinct material quality, submit a physical submittal in addition to the electronic transmittal. This may include, for example, paint draw-down samples, physical roofing samples, or professionally printed product data which includes color card samples or other unique elements.
    a. Where a physical submittal is provided, it shall be suitably packaged and delivered to the University's designated location, including all necessary shipping and handling.
    b. Physical submittals must also be accompanied by an email with an electronic copy of the submittal transmittal and either a scan or photograph of the physical object that was submitted.

3. Transmittal: Utilize the University's approved submittal transmittal template, when provided. The contents of the transmittal shall include:
    a. Project Name and University's Project Number
    b. Name of Architect, Contractor, and University Representative
    c. Specification Section Number and Name
    d. Revision Identifier, eg. "Rev-1"
    e. Applicable Drawing and Detail references, where appropriate
    f. Title, Type, and Description of Submittal
    g. Submission Date
    h. Date Requested for Review Response
    i. Name of Contractor or Subcontractor applicable to the submittal contents
    j. Name of Vendor or Supplier
    k. List if the specific contents of the submittal package
    l. Contractor's statement of review and conformance with the Contract Documents prior to submitting to the University. See below for additional related requirements.
    m. Clear indication of any submittal item which may include a deviation from the Contract

Documents.

n. Space for Review Markings by University and Architect.
o. Additional items may be required on the Transmittal by the University, to be clarified at the Preconstruction Meeting and in the review process of the initial submittals.

4. Distribution of Submittals: The University Representative will forward Submittals to the project Architect and will manage and be included in all communications among Contractor and Architect, where necessary. The University will issue all official submittal responses back to the Contractor.

E. Submittal Processing Time: Make submittals sufficiently in advance of construction activities to allow shipping, handling and review by the University, Architect, and Architect's consultants. Allow sufficient review time so that installation will not be delayed as a result of the time required to process submittals, including time for resubmittals. Allow not less than 15 days for University's initial review and 10 days for each resubmittal review. See Contract General Conditions and Supplementary General Conditions for additional requirements. No extension of Contract Time will be authorized because of failure to transmit complete and accurate submittals to the Architect sufficiently in advance of the Work to permit processing.

F. Grouping of Submittals: Unless otherwise specifically permitted by the University, make all submittals in groups containing all associated items. The University may reject partial submittals as incomplete or hold them until related submittals are made.

G. Unsolicited Submittals: Unsolicited submittals may be returned unreviewed.

1.6 CONTRACTOR'S REVIEW OF SUBMITTALS

A. Contractor's Review of Submittals: Prior to submission to University for review, Contractor shall review each submittal for completeness and conformance to specified requirements. Contractor shall mark statement of review and provide name and title of Contractor's authorized representative for making such statement. Submittals without Contractor's Statement of Review may be rejected, however, per the Contract General Conditions, by transmitting submittals to the University, the Contractor is making such representation. Therefore, the absence of the Contractor's explicit statement of review shall not relieve the Contractor's responsibilities in any way. Contractor's review shall include:

1. All applicable field measurements and dimensions of new work have been verified.
2. Conformance with requirements of the Contract Documents is confirmed.
3. Exact part numbers and similar data are correct.
4. Work being performed by various subcontractors and trades is coordinated.
5. Field construction criteria have been verified and coordinated with the work being performed by others for University and all actual site conditions.
6. All proposed deviations from requirements of Drawings and Specifications have been identified and noted.

B. Changes in Work: Changes in the Work, shall not be authorized by submittals review actions. No review action, implicit or explicit, shall be interpreted to authorized changes in the Work. Changes shall only be authorized by separate written direction from the University Representative, in accordance with the Contract General Conditions. The Contractor must review the General Conditions for requirements related to contract deviations. Where applicable, submit a Substitution Request in accordance with the requirements specified in Section 01 63 00 Product Substitution Procedures, or submit a Request for Information.

1.7 REVIEW OF SUBMITTALS BY UNIVERSITY AND ARCHITECT

A. Review of Submittals by University and Architect: Submittals shall be a communication aid between Contractor, University, and Architect by which interpretation of Contract Documents requirements may be confirmed in advance of construction.

1. Reviews by University's Representative, Architect, and Architect's consultants shall be only for general conformance with the design concept of the Project and general compliance with the information given in the Drawings and Specifications.

2. Except for submittals for information or similar purposes, where action and return is required or requested, the University and Architect will review each submittal, mark to indicate action taken. Responses are to be made within a reasonable timeframe, based on the requirements listed in the Contract Documents as well as the approved Submittals Schedule.

3. Review actions by University, Architect, and Architect's consultants shall not relieve the Contractor from compliance with requirements of the Contract Drawings, Specifications, or from any violation of local, County, State, or Federal laws, rules, codes, ordinances, or rules and regulations of commissions, boards, or other authorities or public utilities having jurisdiction.

B. Review Action: University and Architect will mark each submittal with a uniform, self-explanatory action stamp, sign, and date. Signatures shall be legible or bear the printed name of the signatory. The action shall be marked as follows:

1. "**APPROVED**" -- the Architect takes no specific exception to the information contained in the Submittal; the Contractor may proceed with that portion of the Work described in the Submittal -- subject to compliance with all applicable requirements of the Contract Documents.

2. "**APPROVED AS NOTED**" -- the Architect approves the Submittal for general design conformance with the specific exceptions noted; the Contractor may proceed with that portion of the Work provided that the notations made by the Architect are incorporated in the work -- and subject to compliance with all applicable requirements of the Contract Documents.

3. "**REVISE AND RESUBMIT**" -- the Architect has noted nonconforming work on the submittal, and/or desires clarification on some aspects of the submittal; the Contractor must make revisions and resubmit. The Contractor may not proceed with the work described in the Submittal.

4. "**REJECTED**" -- the Architect believes the Submittal contains significant error or nonconformance; a new submittal is required. The Contractor may not proceed with the work described in the Submittal.

5. "**ACTION NOT REQUIRED**" or "**NOT REVIEWED**" – the Architect believes the Submittal is not required or does not meet the prerequisites for review.

   a. Do not permit submittals marked "Not Approved, Revise and Resubmit" to be used at the Project site, or elsewhere where Work is in progress.

   b. Any work performed prior to receiving a fully approved submittal shall be done at the Contractor's risk and shall be subject to being replaced if Contract requirements are not met.

1.8 PRODUCT DATA SUBMITTALS

A. Product Data: Cut sheets, photographs, illustrations, standard details, standard schedules, performance charts, material characteristics, color and pattern charts, test data, roughing-in diagrams and templates, standard wiring diagrams and performance curves and listings by Code authorities and nationally-recognized testing and inspection services. Where product data must be specially prepared because standard printed data is not suitable for use, submit according to requirements for shop drawings, specified below.

B. Modifications to Standard Product Data: Modify manufacturer's standard catalog data to indicate precise conditions of the Project.

1. Provide space for review action stamps and, if required by authorities having jurisdiction, license seal of Architect and Architect's design consultant, if applicable.

2. Mark each copy to show applicable choices and options. Where printed product data includes information on several products, some of which are not required, mark copies to highlight applicable information.

3. Include the following information:
    a. Manufacturer's printed recommendations,
    b. Compliance with recognized trade association standards,
    c. Compliance with recognized testing agency standards,
    d. Application of testing agency labels and seals,
    e. Notation of dimensions verified by field measurement,
    f. Notation of coordination requirements.

4. Do not submit product data until Contractor determines that it is in compliance with requirements of the Contract Documents.

5. Proceed with installation only using reviewed and approved product data. Do not permit use of unmarked copies of product data in connection with construction. Maintain a copy of all approved submittals at the construction site for review by University representatives, Architect, or Authorities Having Jurisdiction at any time during the performance of the Work.

1.9 SHOP DRAWING SUBMITTALS

A. Shop Drawings: Drawings, diagrams, schedules and other graphic depictions to illustrate fabrication and installation of a portion of the Work. Shop Drawings shall include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings

B. Coordination: Show all field dimensions and relationships to adjacent or critical features of Work.

C. Preparation of Shop Drawings: Shop Drawings include specially-prepared technical data for this Project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects. Shop Drawings shall be prepared by the Contractor or through the Contractor by way of a subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate a portion of the work.

1. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. However, if requested in writing background drawings may be provided to the Contractor for use in the Shop Drawings based on the Architect's explicit approval.

2. Where Calculations are required for the preparation of Shop Drawings, they shall be prepared by a qualified registered California professional engineer who shall sign and stamp the Submittal prior to submission to the University. Indicate all formula and criteria used in the preparation of the calculations. The University and Architect shall both not be responsible for checking the accuracy of the calculations. In addition to the regular identification information required for all submittals, include the name, address, license number, stamp and signature of the engineer.
   Shop Drawings include fabrication and installation drawings, setting diagrams, schedules, patterns, templates and similar drawings.

3. Shop Drawings include specially-prepared technical data for this Project, including drawings, diagrams, performance curves, data sheets, schedules, templates, patterns, reports, calculations, instructions, measurements and similar information not in standard printed form for general application to a range of similar projects. Shop Drawings shall be prepared by the Contractor or through the Contractor by way of a subcontractor, manufacturer, supplier, distributor, or other lower tier contractor, to illustrate a portion of the work.

4. Review of shop drawings or coordination drawings by the University and Architect is only for verification that Contractor has performed coordination Work as specified herein. Review by the University does not relieve the Contractor of compliance with all requirements of the Contract Documents

5. Include the following information:

   a) Include plans, sections, and details complete with information for making connections with other work and any other information necessary to adequately describe the unit of Work.
   b) Identify materials, products, and finishes and, where applicable, use specification section numbers as reference.
   c) Identify details by reference to drawing and detail, schedule, or room numbers.
   d) Identify applicable standards.
   e) Notation of coordination requirements
   f) Detailed Dimensions
   g) Notation of dimensions that have been established by field measurement
   h) Identify proposed deviations from the Contract Documents by clouding and the words "**PROPOSED CONTRACT DEVIATION**" in boldface type or lettering.
   i) Shop Drawings shall be not less than 8-1/2 by 11 inches nor more than 24 by 36 inches, unless approved in advance by the University.
   j) Where coordination requirements necessitate scope of Shop Drawing to include more than one item, label Shop Drawing with specification section number of dominant trade involved. "Dominant" shall be defined as greatest quantity, greatest cost, or principal detail subject of drawing, whichever may be appropriate.
   k) Draw Shop Drawings at large scale, fully detailed and with all materials and stock or purchased components fully identified.
   l) Identify all equipment, locations, and materials using the same tag numbers, names, and technical terms as are used in the Contract Documents.
   m) Provide space for review action stamps and, if required by governing authorities having jurisdiction, license seal of Architect and Architect's design consultant, if applicable.

n) Do not use Shop Drawings without an appropriate final review stamp indicating action taken in connection with construction.

1.10 SAMPLES SUBMITTALS

A. Samples: Full-size, fully-fabricated samples, cured and finished as specified and physically identical with the material or product proposed. Samples shall include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture and pattern.

1. Mount, display, or package Samples in the manner specified to facilitate review of qualities indicated. Prepare Samples to include the following:
   a) Generic description of the Sample
   b) Sample source
   c) Product name or name of manufacturer
   d) Compliance with recognized standards
   e) Availability and delivery time.

2. Submit Samples for review of kind, color, pattern, and texture, for a final check of these characteristics with other elements, and for a comparison of these characteristics between the final submittal and the actual component as delivered and installed.

3. Submit actual samples. Photographic or printed reproductions will not be accepted.

4. Field samples specified in individual Sections are special types of samples. Field samples shall be full-size examples erected on site to illustrate finishes, coatings, or finish materials and to establish the standard by which the Work will be evaluated.

B. Selection Submittals: Where samples are for selection of color, pattern, texture or similar characteristics from a range of standard choices, submit full set of choices for the specified material or product.

C. Quantity: Except for samples illustrating assembly details, workmanship, fabrication techniques, connections, operation and similar characteristics, submit three sets. One sample will be returned marked with the action taken.

1. Maintain sets of samples, as returned, at the Project site, for quality comparisons throughout the course of construction.

2. Unless otherwise noted, full-size and complete samples will be returned and may be incorporated into field mock-ups. Samples may be incorporated into the Work (completed construction) only with written approval of the Architect.

3. Other samples shall be produced and mounted on cardstock in 8-1/2" by 11" format, three-hole punched and suitable for inclusion in product sample binders. Contractor shall provide binders as necessary.

4. Contractor shall prepare and distribute additional samples to subcontractors, manufacturers, fabricators, suppliers, installers, and others as necessary for performance of the Work.

D. Color Samples: University and Architect will review and select colors for Project only after all color samples are received, so that colors may be properly coordinated.

E. Mockups and Field Samples:
   a. Mock-ups and Field Samples specified in technical Specifications Sections, and as shown in the Contract Drawings, are a special type of Sample. Comply with requirements for "samples" to greatest extent possible, and process transmittal forms to provide a record of activity.
   b. Erect at site in locations acceptable to the Architect and the University.
   c. Construct each Mock-Up or Field Sample; include all items required in the finish work.
   d. Mockups or Field Samples shall remain in place until the work it represents has been completed and accepted by the Architect and the University.
   e. Note and preserve the notation of the area constituting the sample installation; remove the notation during the final clean up of the Project.

1.11 MANUFACTURER'S INSTRUCTIONS

A. Manufacturer's Instructions: Submit manufacturer's instructions for preparation, mixing, assembly, handling, application and installation of products, as applicable and as specified in product Sections of the Specifications.

1. Include applicable ICC Evaluation Reports. Evaluation Reports shall be current and shall be annotated for applicable products.
2. Include applicable Material Safety Data Sheets, for Project record only.
3. Include written recommendations, as applicable, from manufacturer for Project conditions.
4. Reviews by Architect and University's Representative: Manufacturer's instructions shall be for information and will not be reviewed by Architect or University's Representative.

1.12 CERTIFICATES OF COMPLIANCE

1. Certificates shall certify compliance with published specifications of trade, industry, or governmental organizations or with the specifications of the Architect and shall attest to the Contractor's compliance with such specifications.
2. Where these specifications set standards by referencing published specifications, submittal of certification may not be required; however, if inspection or performance at the job site after delivery and until the Trustees' final acceptance creates doubt regarding compliance, the Architect and the Trustees reserve the right to receive such certification or, in event compliance cannot be certified, demand removal of questionable Work and its replacement with certifiable Work.
3. When required by the Specifications, submit manufacturers' certificate to the Architect for review.
4. Where feasible, or where required by the Specifications, indicate compliance with the specified standard by means of a label on the container, or in an inconspicuous place on the product.
5. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference date, affidavits and certifications as appropriate.
6. Certificates may be recent or previous test results on material or product, but must be acceptable to the Architect.
7. Each certificate shall bear the notarized signature of an official authorized to certify on behalf of the Contractor, supplier or manufacturer and shall contain the legibly printed name and title of the signatory, the name and address of the Contractor, the project name and location, and the quantity and date or dates of shipment or delivery to which the certificates apply. Certification shall not be construed as relieving the Contractor from furnishing materials and products conforming to the Contract Documents. One certificate bearing the original signature and notary stamp, accompanied by good quality copies to achieve the required total quantity is acceptable.

1.6 REPORTS OF RESULTS OF INSPECTIONS AND TESTS

A. Reports of Results of Inspections and Tests: Submit technical data, test reports, calculations, surveys, and certifications based on field tests and inspections by independent inspection and testing agency and by authorities having jurisdiction.

1. Reports of results of inspections and tests shall not be considered Contract Documents.

2. Refer to Section 01 45 00 - Quality Control for additional requirements.

1.7 OPERATION AND MAINTENANCE DATA SUBMITTALS

A. Refer to requirements specified in Section 01 78 30 - Operation and Maintenance Data. Include operation and maintenance data submittals in Submittals Schedule.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 35 00: ENVIRONMENTAL PROTECTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

1. Environmental Protection Plan
2. Dust and Air Pollution Control
3. Stormwater Pollution Prevention

1.3 RELATED SECTIONS

A. Section 01 35 10 – Hazardous Materials Procedures
B. Section 01 41 00 – Regulatory Requirements
C. Section 01 52 00 – Construction Area and Temporary Facilities
D. Section 01 74 00 – Cleaning Requirements
E. Section 01 74 19 – Waste Management and Recycling

1.4 SUBMITTALS

A. Environmental Protection Plan: Develop and submit an Environmental Protection Plan for the University's review and comment. Incorporate all corrections until a final Plan is approved.
   a. Due within **21 Days** of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. Post in a conspicuous location on the Project Site and maintain a copy in the Contractor's Field Office. Post approved signage in the relevant locations in the Construction Area.
   b. See below for specific content and requirements.
   c. Environmental Protection Plan includes both a type written report as well as coordination drawings that must follow the general requirements for Shop Drawings as per Section 01 33 00 Submittal Procedures.
   d. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes to the Environmental Protection Plan.
   e. Coordinate the Environmental Protection Plan with the requirements of other Sections, Drawings, and the Contract General Conditions.

1.5 ENVIRONMENTAL PROTECTION PROCEDURES, GENERAL

A. Provide protection, operate temporary facilities and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways and subsoil might be contaminated or polluted, or that other undesirable effects might result.

B. Requirements specified in this Section are in addition to those of Article 4.03 of the Contract General Condition and as required by all applicable codes, ordinances, statutes and regulations. During the progress of the work, keep the premises occupied in a neat and clean condition and protect the

environment both on site and off site, throughout and upon completion of the construction project. Coordinate with all other relevant Sections.

C. Review Stormwater Permit requirements listed in Section 01 41 00 Regulatory Requirements. That section includes the University's determination of compliance required for the various stormwater related regulations. This Section, and the Environmental Protection Plan submittal establish the minimum baseline standards for stormwater pollution prevention even where compliance with those regulations is not required.

D. Hazardous Materials: See Section 01 35 10 – Hazardous Materials Procedures.

1.6 ENVIRONMENTAL PROTECTION PLAN

A. Environmental Protection Plan shall include, both written information as well as coordination drawings and figures. Include, at a minimum, the following elements, as applicable:
   1. Air Pollution Control:
      a. Include outline format of project-specific air pollution control rules, regulations, ordinances, and statutes as applicable to the types of Work being performed as per the Contractor's means and methods. Indicate any special aspects of the project which may be of concern and describe measures taken to resolve potential conflicts.

   2. Stormwater BMP Plan:
      a. The Stormwater BMP Plan drawing shall be made by either a qualified individual on an approved topographic site plan background drawing provided by the University that is generally to scale, neat, and legible to fit on paper size not larger than 24"x36." It may be hand-drawn or use computer graphics. The Contractor may utilize the Construction Area Map Exhibit from the Contract Documents, or the approved Construction Area Plan submittal from Section 01 52 00 as a starting place.
         i. The Stormwater BMP Plan shall include, at a minimum, the following:
            1. Identification of BMP's as appropriate for the condition. Tag elements with the BMP# (SE-1, SE-10, etc.) as correlated to the CA Stormwater Quality Association Stormwater Best Management Practice Handbook.
            2. Include all basic BMP's not limited to silt fencing at the top of steep slope grade breaks, straw waddles at the edge of adjacent downhill pavements, storm drain inlet protection, and covering of exposed soils.
            3. Include provisions for dust control and truck tire tracking control.
            4. Include requirements for driveway and roadway vacuuming and/or sweeping.
            5. Other elements as applicable to the particular project.
            6. Provisions for preventing oil, fuel, or other fluids from dripping or leaking from construction vehicles or equipment.
            7. Location of any concrete wash-out facilities.
            8. Requirements for covering waste bins to prevent migration of debris by way of stormwater runoff.
            9. As the Contractor is responsible for all means and methods of construction, the Contractor is responsible for augmenting the baseline BMP measures as appropriate and necessary based on the actual site conditions, sequencing, staging, and overall construction operations.
      b. Supplement the Stormwater BMP Plan with a type-written report in outline format describing the project requirements and include a copy of the CA Stormwater Quality Association Stormwater Best Management Practice Handbook which includes the full requirements for each BMP utilized.

1.7 GENERAL PROTECTION OF ENVIRONMENTAL RESOURCES

A. Protection of Natural Resources: It is intended that the natural resources within the Project boundaries and outside the limits of permanent work performed under this Contract be preserved in their existing condition or be restored to an equivalent or improved condition upon completion of the work.

B. Trees and Landscape Protection: See section 01 52 00 Construction Area and Temporary Facilities for required protection of existing trees and landscaping.

C. Water resources: Comply with all applicable Federal, State and local Codes, ordinances, statutes and regulations pertaining to discharge of pollutants to underground and natural waters.

D. Oil Substances: At all times, special measures shall be taken to prevent oily or other hazardous substances from entering the ground, drainage areas or local bodies of water in such quantities as to affect normal use, aesthetics or produce a measurable impact upon the areas. All soil or water that is contaminated with oily substances due to Contractor's operations shall be disposed of in accordance with applicable regulations, at no change in Contract Time and Contract Sum.

1.8 SMOKE AND ODOR CONTROL PROCEDURES

A. Smoke and Odor Control: Protect all fresh air intakes to existing buildings from exhaust from internal combustion engines, paint and solvent fumes and other noxious fumes and vapors.
B. If fume-generating procedures must occur within 50 feet of an air intake, Contractor shall:
    a. Notify University's Representative at least 14 calendar days in advance of such activities.
    b. Perform Work when it least impacts the University (evenings, weekends or windy days).
    c. Provide carbon filter media, plastic barriers, or other control methods to ensure fresh air only enters into the building ventilation system.

1.9 DUST AND AIR POLLUTION CONTROL PROCEDURES

A. Dust and Air Pollution Control Procedures, General: Requirements of this Section are in addition to those of Article 4.03 of the Contract General Conditions. Employ measures to prevent or minimize creation of dust and air pollution. Contractor shall appoint a dust control monitor to oversee and implement all measures specified in this Article.

1. Unpaved areas shall be wetted down, to eliminate dust formation, a minimum of twice a day.
2. Store all volatile liquids, including fuels or solvents in closed containers.
3. No on-site burning of debris, lumber and other scrap shall be permitted.
4. Properly maintain equipment to reduce gaseous pollutant emissions.
5. Exposed areas, new driveways and sidewalks shall be seeded, treated with soil binders or paved, as appropriate, as soon as possible.
6. Cover stockpiles of soil, sand and other loose materials.
7. Cover trucks hauling soil, debris, sand or other loose materials.
8. Sweep project area streets at least once daily.
9. Refer to Section 01 74 00 - Cleaning Requirements.

1.4 STORMWATER POLLUTION PREVENTION & EROSION AND SEDIMENT CONTROL

A. Implement the SWPPP where coverage under the CA General Permit is required.

B. Implement the approved Stormwater BMP Plan throughout the duration of the project. Prevent any silt, sediment, or other substance to be transported from the Construction Area by means of rain run-off.

C. Filter or otherwise treat any run-off so that it is clean and clear.

D. Any run-off that cannot be treated or filtered sufficiently shall instead be captured and detained on-site or dispersed in landscaped area away from any drainage inlets or other drainage infrastructure which might permit the runoff to gain access to any creeks or other potentially sensitive natural area.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION

3.1 GENERAL

A. Implement the Environmental Protection Plan including the Air Pollution Control Plan and the Stormwater BMP Plan requirements as specified above.

B. Notify University of any discrepancy or issue which may require specific attention.

C. Contractor's failure to comply with the requirements of this section shall be considered a loss to the University and shall be compensated appropriately. Should any regulatory fines or penalties be levied as the result of the Contractor's deficient performance, such fines or penalties shall be the responsibility of the Contractor at no cost to the University.

END OF SECTION

SECTION 01 35 10: HAZARDOUS MATERIAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Hazardous materials procedures

1.3 IDENTIFIED HAZARDOUS MATERIALS

A. Identified Hazardous Materials:

1. No hazardous materials investigations have been conducted for the University for this Project. If there was a report available, it would be listed here or as Available Information on the Drawings.

2. Although the Work does not include any known hazardous materials or abatement, Contractor shall exercise caution as required by the Contract General Conditions Article 4.08d.
   a. Comply with California Code of Regulations, Title 8, Sections 1529, 1532.1 and 5208.
   b. Comply with hazardous materials requirements in the University's Contractor Safety Handbook, provided to Contractor under separate cover by University's Representative.

3. Architect assumes no responsibility relating to existence of any identified hazardous materials, or liability for performance of the Work.

1.4 UNIDENTIFIED HAZARDOUS MATERIALS

A. Unidentified Hazardous Materials:

1. Except as otherwise specified, in the event that Contractor encounters on the project site material believed to be potentially containing asbestos, polychlorinated biphenyl (PCB), or other hazardous materials which have not been rendered harmless, the Contractor shall immediately stop work in the area affected and report the condition to University's Representative in writing as a Request for Interpretation (RFI).

2. Work in the affected area shall not be resumed except by written agreement between University and Contractor if in fact the material is asbestos, PCB, or other hazardous materials and has not been rendered harmless.

3. Work in the affected area shall be resumed in the absence of asbestos, PCB or other hazardous materials, or when such materials have been rendered harmless in a manner specified by the State of California Hazardous Substances Control Law (Health and Safety Code Division 20, Chapter 6.5).

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 35 50: SAFETY PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Procedures for health and safety protection and requirements for reporting accidents.

1.3 RELATED SECTIONS

A. Section 01 35 10 - Hazardous Material Procedures: Protection from asbestos containing materials (ACM), polychlorinated biphenyl (PCB), or other hazardous materials.

B. Section 01 52 00 – Construction Area and Temporary Facilities.

C. Contract General Conditions – Article 4.08d.

1.4 SUBMITTALS

A. Accident Reports: A copy of each accident report, which the Contractor or subcontractors submit to their insurance carriers, shall be forwarded to the Architect and to the University Representative as soon as possible, but in no event later than 5 calendar days after the day the accident occurred.

PART 2 - PRODUCTS

2.1 GENERAL

A. Special facilities, devices, equipment, clothing, and similar items used by the Contractor in the execution of the Work shall comply with applicable regulations.

PART 3 - EXECUTION

3.1 STOP WORK ORDERS

A. Stop Work Orders:

1. When the Contractor or its subcontractors are notified by the University's Representative of an incident of noncompliance with the provisions of the Contract, and the action(s) to be taken, the Contractor shall immediately, if so directed, or within 48 hours after receipt of a notice of violation, correct the unsafe or unhealthy condition.

2. If the Contractor fails to comply promptly, all or any part of the work performed may be stopped by with a "Stop Work Order." When, in the opinion of the University's Representative, satisfactory corrective action has been taken to correct the unsafe and unhealthy condition, a

written release of the stop work order will be issued as soon as possible.

3. The Contractor shall not be allowed any extension of time or compensation for damages by reason of or in connection with such work stoppage.

3.2 PROTECTION

A. Protection: Contractor shall take all necessary precautions to prevent injury to the public, building occupants, or damage to property of others. Such measures shall not be prescribed by the University or Architect, but shall be the responsibility solely of the Contractor.

1. For the purposes of the Contract, the public or building occupants shall include all persons not employed by the Contractor or a subcontractor working under the Contractor's direction.

2. Work shall not be performed in any area occupied by the public or University's employees unless specifically permitted by the Contract or subsequent written agreements are made with adequate steps taken for the protection of the public and the University's employees.

3. Whenever practicable, the work area shall be fenced, barricaded, or otherwise blocked off from the public or building occupants to prevent unauthorized entry into the work area.

B. Alternate Precautions: When the nature of the Work prevents isolation of the work area, and the public or building occupants may be in or pass through, under or over the work area, alternate precautions such as the posting of signs, the use of signal persons, the erection of barricades or similar protection around any hazardous operations shall be used as appropriate.

C. Public Thoroughfare: When Work is to be performed over a public thoroughfare such as a sidewalk, lobby, or corridor, the thoroughfare shall be closed, if possible, or other precautions taken such as the installation of screens or barricades. When the exposure to heavy falling objects exists, as during the erection of building walls or during demolition, special protection of the type detailed in 29 CFR 1910/1926 shall be provided.

D. Hazardous Conditions: Storing, positioning or use of equipment, tools, materials, scraps, and trash in a manner likely to present a hazard to the public or building occupants by its accidental shifting, ignition, or other hazardous qualities is prohibited.

END OF SECTION

SECTION 01 41 00: REGULATORY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 RELATED DOCUMENTS

A. Contract General Conditions
   a. See Article 4.11, and see below in this Section for detailed responsibilities for certain permit fees.
B. Special Conditions
C. Section 01 45 00 - Quality Control

1.3 AUTHORITY AND PRECEDENCE OF CODES, ORDINANCES AND STANDARDS

A. Authority: All codes, ordinances and standards referenced in the Drawings and Specifications shall have the full force and effect as though printed in their entirety in the Project Manual.

B. Precedence:

1. Where specified requirements differ from the requirements of applicable codes, ordinances and standards, the more stringent requirements shall take precedence.

2. Where the Drawings or Specifications require or describe products or execution of better quality, higher standard or greater size than required by applicable codes, ordinances and standards, the Drawings and Specifications shall take precedence so long as such increase is not in violation of any codes, ordinances, or standards.

3. Where no requirements are identified in the Drawings or Specifications, comply with all requirements of applicable codes, ordinances and standards of authorities having jurisdiction.

1.2 APPLICABLE CODES, LAWS AND ORDINANCES

A. Applicable Codes, Laws and Ordinances:

1. Performance of the Work shall meet or exceed the minimum requirements of California Code of Regulations (CCR), Title 24, including, but not limited to the following, including all effective Supplements and Errata and all codes and standards referenced within:

   a. Part 1: 2019 California Building Standards Administrative Code.
   b. Part 2: 2019 California Building Code (CBC)
   c. Part 3: 2019 California Electrical Code (CEC)
   d. Part 4: 2019 California Mechanical Code (CMC)
   e. Part 5: 2019 California Plumbing Code (CPC)
   f. Part 6: 2019 California Energy Code (CEC)
   g. Part 9: 2019 California Fire Code (CFC)

h. Part 11: 2019 California Green Building Standards Code (CalGreen)
i. Part 12: 2019 California Reference Standards Code
j. CCR Title 19 Public Safety: Division 1. State Fire Marshal
k. CCR Title 22
l. CCR Title 24
m. 2016 NFPA 13 Standard for the Installation of Sprinkler Systems (CA Amended)
n. 2016 NFPA 72 National Fire Alarm & Signaling Code (CA Amended)
o. 2013 NFPA 25 California Edition, Inspection, Testing & Maintenance of Water Based Fire Protection Systems (CA Amended)

2. In accordance with Education Code Section 66606, the Trustees of the California State University shall serve as the Building Official for this project, and the Humboldt State University Campus Deputy Building Official shall be the authority having jurisdiction.

2. State Fire Marshal: Performance of the Work shall also comply with applicable requirements of California Code of Regulations (CCR) Title 19 - Public Safety, per the Authority of the Office of the State Fire Marshal (SFM).
    a. The University shall be responsible for obtaining plan check approval and for permit and inspection fees collected by the SFM. This shall include the permit fees for the deferred submittal reviews, for fire sprinkler and fire alarm systems, where applicable.
    b. If the Work is not installed in accordance with the SFM's requirements, such that specific deficiencies in the Work, after the first SFM inspection, are still not corrected to the satisfaction of the SFM after a second inspection, the Contractor shall be responsible for the SFM costs for the third and all subsequent inspections for that item or area of the Work.
    c. If the Contractor proposes an alternate means of accomplishing the design intent of the Contract Documents, such that additional plan approval fees would be required by the SFM, then the Contractor shall be responsible for securing any and all associated required approvals at no cost to the University.

3. Division of the State Architect, Accessibility: The Work shall comply with the most restrictive provisions of the Americans with Disabilities Act (ADA) and CA CBC Chapter 11B, per the Authority of the CA Division of the State Architect (DSA).
    a. The University shall be responsible for obtaining plan check approval and for permit and inspection fees collected by the DSA.
    b. If the Work is not installed in accordance with the DSA's requirements, such that specific deficiencies in the Work, after the first inspection, are still not corrected to the satisfaction of the accessibility inspector after a second inspection, the Contractor shall be responsible for the accessibility inspector's costs for the third and all subsequent inspections for that item or area of the Work.
    c. If the Contractor proposes an alternate means of accomplishing the design intent of the Contract Documents, such that additional plan approval fees would be required by the DSA, then the Contractor shall be responsible for securing any and all associated required approvals at no cost to the University.

4. Stormwater Permit: The following items are a more specific review of the applicable regulations and amends the requirements listed under Article 4.03b of the Contract General Conditions.
    a. The Contractor is not required to develop or implement a Storm Water Pollution Prevention Plan (SWPPP) under the California General Permit for as the proposed construction activity results in land disturbance of less than one acre and is therefore except from that specific requirement.

b. Under the SWQCB Phase II Small MS4 General Permit Order No. 2013-0001-DWQ, Section E.12.c(ii). The project does not create and/or replace 5,000 square feet or more of impervious surface, therefore it is not a “Regulated Project” and does not require compliance with those provisions for numeric calculations for sizing stormwater retention or treatment.

c. The project does create and/or replace between 2,500 square feet and 5,000 square feet of impervious surfaces, and therefore does require compliance with SWQCB Phase II Small MS4 General Permit Order No. 2013-0001-DWQ, Section E.12.b. Those “Site Design Measures” have been incorporated into the project design, including rerouting of rooftop drainage into an existing bioswale filtration and detention system. The Contractor has no further responsibilities for this compliance measure.

d. Regardless of the items listed above, the Contractor shall be responsible for designing, implementing, inspecting, and maintaining, pollution control BMP's to the satisfaction of the University in accordance with the Environmental Protection Plan submittal required by Section 01 35 00 Environmental Protection. This shall establish the minimum baseline standards under this contract.

5. Air Quality Permit: Where required in accordance with Section 01 35 10 Hazardous Materials Procedures, or elsewhere in the Contract Documents, the Contractor is responsible for obtaining a permit from the North Coast Unified Air Quality Management District (NCUAQMD) for notification and asbestos abatement in accordance with NESHAP. Submit permit to University Project Manager for approval prior to start of Work.

B. Other Applicable Laws, Ordinances and Regulations:

1. Work shall be accomplished in conformance with all applicable laws, ordinances, rules and regulations of Federal, State, and special district agencies and jurisdictions, where having authority.

2. Performance of the Work shall be accomplished in conformance with all rules and regulations of public utilities, utility districts and other agencies serving the facility.

3. Where such laws, ordinances, rules and regulations require more care or greater time to accomplish Work, or require better quality, higher standards or greater size of products, Work shall be accomplished in conformance to such requirements with no change to the Contract Time and Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to the execution date of the Agreement.

5. References on the Drawings or in the Specifications to "code", "Code" or "building code" similar terms, not otherwise identified, shall mean the codes specified above, together with all additions, amendments, changes, and interpretations adopted by code authorities of the jurisdiction having authority over the Project.

5. Unless otherwise specified, specific references to codes, regulations, standards, manufacturers' instructions, or requirements of regulatory agencies, when used to specify requirements for materials or design elements, shall mean the edition of each in effect as identified in the Contract Documents. If no particular edition is identified, the edition in effect on the publication date of the Bid Package shall govern.

PART 2 – PRODUCTS (Not used)
PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 42 00: REFERENCE STANDARDS AND DEFINITIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Use of references in Drawings and Specifications, including requirements for copies of reference standards at Project site.

B. Definitions of terms used in Specifications and Drawings, including abbreviations, acronyms, names and terms which may be used in Specifications.

1.3 RELATED SECTIONS

A. Section 01 41 00 - Regulatory Requirements: Identification of applicable building Code and other codes, ordinances and regulations applicable to performance of the Work.

1.4 USE OF REFERENCES

A. References: The Drawings and Specifications contain references to various standards, standard specifications, codes, practices and requirements for products, execution, tests and inspections. These reference standards are published and issued by the agencies, associations, organizations and societies listed in this Section or identified in individual product specification Sections.
   1. Wherever term "Agency" occurs in Standard Specifications, it shall be understood to mean the term used for University for purposes of the Contract.
   2. Wherever term "Engineer" occurs in Standard Specifications, it shall be understood to mean Architect or other responsible design professional for purposes of the Contract.
   3. Where reference is made to Standard Details, such reference shall be to the Standard Details accompanying the Standard Specifications.

B. Relationship to Drawings and Specifications: Such references are incorporated into and made a part of the Drawings and Specifications to the extent applicable.

C. Referenced Grades Classes and Types: Where an alternative or optional grade, class or type of product or execution is included in a reference but is not identified on the Drawings or in the Specifications, provide the highest, best and greatest of the alternatives or options for the intended use and prevailing conditions.

D. Copies of Reference Standards:

   1. Reference standards are not furnished with the Drawings and Specifications. The Contractor, subcontractors, manufacturers, suppliers, trades and crafts shall be familiar with these generally-recognized standards of the construction industry. Copies of reference standards must be obtained from publishing sources.

E. Jobsite Copies:
1. Contractor shall obtain and maintain at the Project site copies of all relevant reference standards identified on the Drawings and Specifications in order to properly execute the Work.

2. In addition to the complete current Contract Documents, Drawings, Specifications, Submittals, RFI's, and other Project Documents that shall absolutely be readily available at the site, the Contractor shall determine which of the following should be readily available at the site, as applicable to the Work. Where specific issues arise that a reference document is necessary for the resolution of an issue, the Contractor shall make such available as early as possible without causing delay to the progress of the Work:
   a. State Building Codes: As referenced in Section 01 41 00 - Regulatory Requirements.
   b. Safety Codes: Occupational Safety and Health Act (OSHA) regulations and State of California, California Administrative Code, California Code of Regulations (CCR), Title 8 - Industrial Relations, Chapter 4, Subchapter 7, General Industry Safety Orders (Cal-OSHA), to extent applicable to the Work.
   c. General Standards:
      1) Underwriters Laboratories, Inc. (UL) Building Products Listing.
      2) Factory Mutual Research Organization (FM) Approval Guide.
      3) American Society for Testing and Materials (ASTM) Standards in Building Codes.
      4) American National Standards Institute (ANSI) standards.
   d. Fire and Life Safety Standards: All related referenced standards.
   e. Common Materials Standards: American Concrete Institute (ACI), American Institute of Steel Construction (AISC), American Welding Society (AWS), Gypsum Association (GA), National Fire Protection Association (NFPA), Tile Council of America (TCA) and Woodwork Institute of California (WIC) standards.
   f. Research Reports: ICC Evaluation Service, Inc. (ICC-ES). Reports (NER), for products not in conformance to prescribed requirements of the California Building Code (CBC).
   g. Product Listings: Approval documentation, indicating approval of authorities having jurisdiction for use of product within the applicable jurisdiction.

F. Edition Date of References:
1. When an edition or effective date of a reference is not given, it shall be understood to be the current edition or latest revision published as of the date of the Invitation for Bid. All amendments, changes, errata and supplements as of the effective date shall be included.

G. ASTM and ANSI References: Specifications and Standards of the American Society for Testing and Materials (ASTM) and the American National Standards Institute (ANSI) are identified in the Drawings and Specifications by abbreviation and number only and may not be further identified by title, date, revision or amendment. It is presumed that the Contractor is familiar with and has access to these nationally- and industry-recognized specifications and standards.

1.5 DEFINITIONS OF TERMS

A. Basic Contract Definitions: Words and terms governing the Work are defined in the Contract General and Supplementary Conditions, as referenced in the Agreement.

B. Words and Terms Used on Drawings and in Specifications: Additional words and terms may be used in the Drawings and Specifications and are defined as follows:
1. "Applicable:" As appropriate for the particular condition, circumstance or situation.

2. "Approve(d):" Approval action shall be limited to the duties and responsibilities of the party

giving approval, as stated in the Conditions of the Contract. Approvals shall be valid only if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences and procedures of construction. Approval shall not relieve the Contractor from responsibility to fulfill Contract requirements.

3. "And/or:" If used, shall mean that either or both of the items so joined are required.

4. "Directed:" Limited to duties and responsibilities of the University's Representative or Architect as stated in the Contract General Conditions, meaning "as instructed by the University's Representative or Architect, in writing, regarding matters other than the means, methods, techniques, sequences and procedures of construction. Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the University's Representative or Architect", "requested by the University's Representative or Architect", and similar phrases. No implied meaning shall be interpreted to extend the responsibility of the University's Representative, Architect or other responsible design professional into the Contractor's supervision of construction.

5. "Equal" or "Equivalent:" As determined by Architect or other responsible design professional as being equivalent, considering such attributes as durability, finish, function, suitability, quality, utility, performance and aesthetic features.

6. "Furnish" or “Supply:” Means "supply and deliver, to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

7. "Indicated:" The term indicated refers to graphic representations, notes, or schedules on the Drawings, or other Paragraphs or Schedules in the Specifications, and similar requirements in the Contract Documents. Terms such as "shown", "noted", "scheduled", and "specified" are used to help the reader locate the reference and shall have the same meaning as “indicated.” There is no limitation on location.

8. "Install:" Describes operations at the Project site including the actual unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.

9. "Installer:" Refers to the employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

10. "Necessary:" With due considerations of the conditions of the Project and as determined in the professional judgment of the Architect or other responsible design professional as being necessary for performance of the Work in conformance with the requirements of the Contract Documents, but excluding matters regarding the means, methods, techniques, sequences and procedures of construction.

11. Owner: synonymous with “Trustees” per Contract General Conditions section 1.00. Also synonymous with “Campus,” “CSU,” “HSU,” “Humboldt State University,” and “University.”

12. "Per:" Same as "in accordance with," "according to" or "in compliance with."

13. "Products:" Material, system or equipment.

14. "Proper:" As determined by the Architect or other responsible design professional as being proper for the Work, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, which are solely the Contractor's responsibility to determine.

15. "Provide:" Means "furnish and install, complete and ready for the intended use."

16. "Regulation:" Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, as well as and rules, conventions and agreements within the construction industry that control performance of the Work.

17. "Required:" Necessary for performance of the Work in conformance with the requirements of the Contract Documents, excluding matters regarding the means, methods, techniques, sequences and procedures of construction, such as:
    a. Regulatory requirements of authorities having jurisdiction.
    b. Requirements of referenced standards.
    c. Requirements generally recognized as accepted construction practices of the locale.
    d. Notes, schedules and graphic representations on the Drawings.
    e. Requirements specified or referenced in the Specifications.
    f. Duties and responsibilities stated in the Bidding and Contract Requirements.

18. "Selected:" As selected by the University's Representative, Architect or other responsible design professional from the full selection of the manufacturer's products, unless specifically limited in the Contract Documents to a particular quality, color, texture or price range.

19. "Site:" Same as "Site of the Work" or "Project Site;" the area or areas or spaces occupied by the Project and including adjacent areas and other related areas occupied or used by the Contractor for construction activities, either exclusively or with others performing other construction on the Project. The extent of the Project Site is shown on the Drawings, and may or may not be identical with the description of the land upon which the Project is to be built.

20. “Substitution:” A product that is of lesser or greater quality or performance than the specified material or equipment

21. "Testing Laboratory or Agency:" An independent entity engaged to perform specific inspections or tests, at the Project Site or elsewhere, and to report on, and, if required, to interpret, results of those inspections or tests. Refer to Section 01 45 80 - Testing Laboratory Services.

1.6 ABBREVIATIONS, ACRONYMS, NAMES AND TERMS, GENERAL

A. Abbreviations, Acronyms, Names and Terms: Where acronyms, abbreviations, names and terms are used in the other Contract Documents, they shall mean the recognized name of the trade association, standards generating organization, authority having jurisdiction or other entity applicable.

B. Abbreviations and Acronyms for Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale Research's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S." or Dictionary of Architecture and Construction, Fourth Edition (Cyril M. Harris, McGraw-Hill).

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 45 00: QUALITY CONTROL & INSPECTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Regulatory requirements for testing and inspection.

B. Contractor's quality control.

C. Quality of the Work.

D. Inspections and tests by authorities having jurisdiction.

E. Inspections and tests by serving utilities.

F. Inspections and tests by manufacturer's representatives.

1.3 RELATED SECTIONS

A. Section 01 31 00 – Project Coordination: Coordination of Work under Contract.

B. Section 01 41 00 - Regulatory Requirements: Applicable codes, ordinances and standards.

C. Section 01 45 80 - Testing Laboratory Services: Selection of independent testing and inspection laboratory; tests and inspections conducted by testing laboratory.

D. Section 01 61 00 - Basic Product Requirements: Product options, substitutions, transportation and handling requirements, storage and protection requirements, and system completeness requirements.

1.4 REQUIRED SUBMITTALS

A. Inspection List Submittal – Submit list of required inspections as applicable to the Work and in sequence that will be required based on the Contractor's Construction Schedule. See below for additional requirements. This is an "initial" submittal and is due within 21 Days of the start date established in the Notice to Proceed as per Section 01 33 00 Submittal Procedures. Make any corrections necessary and review the approved Inspection List at each Construction Progress Meeting.

B. Inspection and Test Reports – Submit all inspection and test reports to the University within 3 Days of Contractor's receipt from the inspector or testing agencies.

REGULATORY REQUIREMENTS FOR TESTING AND INSPECTION

A. Comply with requirements for testing and inspections and correction of deficiencies as interpreted

by authorities having jurisdiction. It shall be the responsibility of the Contractor to request, schedule, and coordinate all necessary inspections.

1.5 CONTRACTOR'S QUALITY CONTROL

A. Contractor's Quality Control: Contractor shall ensure that products, services, workmanship and site conditions comply with requirements of the Drawings and Specifications by coordinating, supervising, testing and inspecting the Work and by utilizing only suitably qualified personnel.

B. Quality Requirements: Work shall be accomplished in accordance with quality requirements of the Drawings and Specifications, including, by reference, all Codes, laws, rules, regulations and standards. When no quality basis is prescribed, the quality shall be in accordance with the best accepted practices of the construction industry for the locale of the Project, for projects of this type.

C. Coordination of Field Quality Control: Contractor shall coordinate and schedule field quality control activities of University's independent testing and inspection agency and inspectors from authorities having jurisdiction.

1.6 QUALITY OF THE WORK

A. Quality of Products: Unless otherwise indicated, all products shall be new, free of defects and fit for the intended use.

B. Quality of Installation: All Work shall be produced plumb, level, square and true, or true to indicated angle, and with proper alignment and relationship between the various elements.

C. Protection of Existing and Completed Work: Take all measures necessary to preserve and protect existing and completed Work free from damage or staining, until Acceptance by the University.

D. Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Unless more stringent requirements are indicated or specified, comply with manufacturer's instructions and recommendations, reference standards and building code research report requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.

E. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: Prior to implementing any proposed deviation, document and explain all deviations from reference standards and building code research report requirements and manufacturer's product installation instructions and recommendations, including acknowledgement by the manufacturer that such deviations are acceptable and appropriate for the Project.

F. Verification of Quality: Work shall be subject to verification of quality by University or Architect in accordance with provisions of the Contract General Conditions.

1. Cooperate by making Work available for inspections and observations by University's Representative, Architect and their consultants.

2. Provide access to all parts of the Work, including plants or shops where materials or equipment are manufactured or fabricated.

3. Provide all information and assistance as necessary, including that from subcontractors, fabricators, materials suppliers and manufacturers, for verification of quality by University's Representative or Architect.

4. Contract modifications, if any, resulting from such verification activities shall be governed by applicable provisions in the Contract General Conditions.

G. Observations by Architect and Architect's Consultants: Periodic and occasional observations of Work in progress will be made by Architect and Architect's consultants as deemed necessary to review progress of Work and general conformance with the design intent.

H. Limitations on Inspection, Test and Observations: Employment of an independent testing and inspection agency and observations by Architect and Architect's consultants shall not relieve Contractor of the obligation to perform Work in full conformance to all requirements of Contract Documents and applicable Building Code and other regulatory requirements.

I. Rejection of Work: The University reserves the right to reject any and all Work not in conformance to the requirements of the Contract Documents.

J. Correction of Non-Conforming Work: Non-conforming Work shall be modified, replaced, repaired or redone by the Contractor at no change in Contract Sum or Contract Time.

K. Acceptance of Non-Conforming Work: Acceptance of non-conforming Work, without specific written acknowledgement and approval of the University's Representative, shall not relieve the Contractor of the obligation to correct such Work.

L. Contract Adjustment for Non-conforming Work: Should University's Representative determine that it is not feasible or not in University's interest to require non-conforming Work to be repaired or replaced, an equitable reduction in Contract Sum shall be made by agreement between University's Representative and Contractor. If an equitable amount cannot be agreed upon, a Field Instruction will be issued and the amount in dispute resolved in accordance with applicable provisions of the Contract General Conditions.

M. Non-Responsibility for Non-Conforming Work: Architect and Architect's consultants disclaim any and all responsibility for Work produced that is not in conformance with the Contract Drawings and Contract Specifications.

1.7 INSPECTIONS AND TESTS BY AUTHORITIES HAVING JURISDICTION

A. Inspections and Tests by Authorities Having Jurisdiction: Contractor shall cause all tests and inspections required by authorities having jurisdiction to be made for Work under this Contract.

1. Except as specifically noted, scheduling, coordinating and conducting such inspections and tests shall be solely the Contractor's responsibility.

2. All time required for inspections and tests by authorities having jurisdiction shall be included in the Contract Time.

3. Costs for inspections and tests by authorities having jurisdiction will be paid by University, except as specified in Section 01 40 00 Regulatory Requirements for subsequent fees after failed inspections.

A. General: All construction work shall be subject to inspection by the University, and other authorities having jurisdiction. All such construction or work shall remain accessible and exposed for inspection purposes until approved by the associated Inspector.

1. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of the building code or of other ordinance. Inspections presuming to give authority to violate or cancel the provisions of code, or requirements of the Contract Documents, shall not be valid.

B. Contractor shall confirm that the Work is entirely complete and ready for inspection at least one hour prior to the time requested for the inspection and shall notify the Inspector.

C. Approval Required: Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the Inspector or inspecting authority. The Inspector, upon notification, shall make the requested inspections and shall either indicate that the work complies with requirements or does not comply with requirements. The Contractor shall correct any portions that do not comply and such portion shall not be covered or concealed until re-inspected and approved

1. There will be a comprehensive inspection prior to Acceptance by the University; and also prior to occupancy by the University if occupancy is prior to Acceptance.

D. Inspection Coordination: Contractor shall describe anticipated requests when presenting the look-ahead schedule at progress meetings. Reinforcing steel, structural framework, or interior wall and/or ceiling support framing of any part of any building or structure shall not be covered or concealed without first obtaining the approval of the Inspector.

1.8 INSPECTIONS LIST SUBMITTAL

A. Inspection List Submittal: Contractor shall review the Contract Documents and prepare a comprehensive list of all required tests and inspections; the list shall be submitted to the University for review and comment. The Inspection List will be reviewed at each Construction Progress meeting. Required inspections include but are not limited to:

1. Inspections required by California Building Code Section 110.
2. Inspections required by the State Fire Marshal.
3. Frame Inspection: To be made after all framing, fire blocking and bracing are in place and all pipes and vents are complete and the rough electrical, plumbing and heating wires, pipes and ducts are approved.
4. Mechanical and Electrical Rough-In Inspection: To be made after all mechanical and electrical rough-in work is completed.
5. Lath or Gypsum Board Inspection: To be made after all lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.
6. Backfill & Compaction Inspection: to be made as work progresses.
7. Concrete Compression Testing: as work progresses.
8. Pressure Testing of Mechanical Equipment and Piping.
9. Fire Alarm and Life Safety Systems.
10. Final Inspection: When building is completed and ready for occupancy.
11. Other Inspections:
    a. As required by the University to ascertain compliance with the provisions of the Contract Documents and approved Submittals.

b. Re-inspections: A re-inspection fee may be assessed for each inspection or re-inspection when such portion of work for which inspection is called is not complete or when corrections called for are not made.

1.9 TEST AND INSPECTION REPORT SUBMITTALS

A. Inspectors and testing agencies shall submit a written report of each inspection, test or similar service, to the University, the Contractor, the Architect, and others as requested or required by the Contract Documents.

B. Test and Inspection Reports shall be provided on forms approved by the University. Written reports of each inspection, test or similar service shall include:

1. Number and name of inspection or test, identical to request
2. Date of report
3. University' Project name and number,
4. Printed name and contact information for inspection or testing agency
5. Dates, locations, and ambient conditions of samples and tests or inspections
6. Designation of the inspection or test method,
7. Identification of the requirement to be satisfied by the inspection or test
8. Complete inspection or test data,
9. Test results and an interpretation of test results,
10. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements,
11. Description of any aspects of the work out of compliance;
12. Clear indication of whether the results are entirely satisfactory and whether retesting or re-inspection is required.
13. Printed name and signature of individual performing the inspection or test

1.10 INSPECTIONS AND TESTS BY SERVING UTILITIES

A. Inspections and Tests by Serving Utilities: Contractor shall cause all tests and inspections required by serving utilities to be made for Work under the Contract.

1. Except as specifically noted, scheduling, coordinating and conducting such inspections and tests shall be solely the Contractor's responsibility. All time required for inspections and tests by serving utilities shall be included in the Contract Time.

2. Except as specifically noted, all costs for inspections and tests by serving utilities shall be included in the Contract Sum.

1.11 INSPECTIONS AND TESTS BY MANUFACTURER'S REPRESENTATIVES

A. Inspections and Tests by Manufacturer's Representatives: Contractor shall cause all required tests and inspections to be conducted by materials or systems manufacturers. Additionally, all tests and inspections required by materials or systems manufacturers as conditions of warranty or certification

of Work shall be made, the cost of which shall be included in the Contract Sum.

1. Scheduling, coordinating and conducting such inspections and tests shall be solely the Contractor's responsibility. All time required for inspections and tests by manufacturer's representatives shall be included in the Contract Time.

2. All costs for inspections and tests by manufacturer's representatives shall be included in the Contract Sum.

1.12 INSPECTIONS BY INDEPENDENT TESTING AND INSPECTION AGENCY

A. Inspections by independent Testing Laboratory: Refer to Section 01 45 80 - Testing Laboratory Services.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION

SECTION 01 45 80: **TESTING LAB SERVICES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Administrative and procedural requirements for testing laboratory services.

1.3 RELATED SECTIONS

A. Section 01 41 00 – Regulatory Requirements for

B. Section 01 45 00 - Quality Control and Inspections: General requirements for inspections and tests.

C. Individual Product Specifications Sections: Specific requirements for inspections and tests.

1.4 RESPONSIBILITIES

A. Testing Laboratory: University will engage and pay for the services of an independent agency to perform inspections and tests specified as the University' responsibility.
   1. The above shall apply for the Geotechnical and Testing Lab inspections as specified on structural sheets for Special Inspections.
   1. Where the University have engaged a testing agency or other entity for testing and inspection of a part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the University, unless otherwise agreed in writing with the University.

B. Retesting: The Contractor is responsible for the cost of retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
   1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

C. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested.

D. Coordination: The Contractor, Project Manager/Inspector, and each agency engaged to perform inspections, testing and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.
   1. The Contractor is responsible for communicating to the Project Manager/Inspector the scheduling times for inspections, tests, taking samples and similar activities.

E. Payment for Testing Laboratory Services:
   1. Unless otherwise specified, University will pay for tests and inspections performed by Testing Laboratory, as specified in individual product Sections of the Specifications. Overtime costs due to scheduling for the convenience of the Contractor or to make up for Work behind schedule shall be deducted by Change Order from Contract Sum.

   2. When tests and inspections are required on an overtime basis, initial payment will be made by the University. All costs for overtime testing and inspections shall be deducted by Change Order from Contract Sum.

   3. Unless otherwise specified, Contractor shall be back-charged for mileage and travel time for inspection services requiring more than 60 miles from Project site to test products purchased by Contractor.

      a. Testing laboratory shall forward all billings and records of such costs to University's Representative for approval. Such costs, if determined by University's Representative to be attributable to the Contractor under this provision, shall be deducted by Change Order.

   4. Contractor shall pay all costs for repeated observations, reinspection or retesting by Testing Laboratory due to non-conforming Work. Costs shall be deducted by Change Order.

   5. Additional Tests, Inspections and Related Services: Contractor shall be charged costs for additional tests, inspections and related services, due to the following. Such costs shall be deducted by Change Order from Contract Sum.

      a. Work is not ready to inspect when inspectors arrive.
      b. Failure to properly schedule or notify testing agency or authorities having jurisdiction.
      c. Changes in sources, lots or suppliers of products after original tests or inspections.
      d. Changes in means methods, techniques, sequences and procedures of construction that necessitate additional testing, inspection and related services.
      e. Changes in mix designs for concrete after review and acceptance of submitted mix design.
      f. Multiple off-site fabrication sites.
      g. Fabrication and installation errors.
      h. Inefficient or poorly organized fabrication that causes additional testing costs to be incurred.

F. Segregation in Billing of Overtime Services: Billings for overtime services shall have straight time and overtime costs segregated and shall have substantiation by detailed explanations justifying necessity of services on overtime basis.

G. Obligation to Perform Work According to Contract Documents: Employment of Testing Laboratory shall in no way relieve Contractor of obligation to perform Work in accordance with requirements of Contract Documents and applicable Codes.

H. Limits on Testing Laboratory's Authority:
   1. Testing Laboratory may not release, revoke, or requirements of Contract Documents.
   2. Testing Laboratory may not approve or accept any portion of the Work.
   3. Testing Laboratory may not assume any duties of Contractor.
   4. Testing Laboratory shall have no authority to stop Work.

I. Contractor's Responsibilities to Testing Laboratory: Contractor shall make the Work in all stages of progress available for personal and continuous observation by the Testing Laboratory.

1. Testing Laboratory shall have free access to any and all parts of the Work at all times.
2. Contractor shall provide the Testing Laboratory with reasonable facilities for Testing Laboratory to obtain such information as Testing Laboratory determines is necessary for Testing Laboratory to be kept fully informed of the progress and manner of performance of the Work and character of products, according to Testing Laboratory's duties and responsibilities.
3. Observation and inspection of the Work by Testing Laboratory shall not relieve Contractor from any obligation to fulfill the requirements of the Contract.

J. Retesting: When materials tested fall to meet requirements herein specified, they shall be promptly corrected or removed and replaced and retested in a manner required by University's Representative. Costs involved in retesting shall be deducted by Change Order from Contract Sum.

1.5 TESTS AND INSPECTIONS

A. Tests and Inspections, General: All construction work shall be subject to inspection by the University and the Architect and all such construction or work shall remain accessible and exposed for inspection purposes until approved by the University.

1. The University will provide project personnel, including inspectors, at the project site.
2. Approval as a result of an inspection shall not be construed to be an approval of a violation of the provisions of the building code or of other ordinances of the jurisdiction, including plans and specifications. Inspections presuming to give authority to violate or cancel the provisions of code, or of plans and specifications shall not be valid.
3. It shall be the duty of the contractor to cause the work to remain accessible and exposed for inspection purposes. Neither the Inspector nor the University or Architect shall be liable for expense entailed in the removal or replacement of any material required to allow inspection.

B. Inspection Requests: It shall be the duty of the Contractor doing the work to notify the Inspector that such work is ready for inspection. The University require that such work is ready for inspection. The University require that every request for inspection be filed at least two working days–before such inspection is desired. Such requests shall be in writing.

C. Approval Required: Work shall not be done beyond the point indicated in each successive inspection without first obtaining the approval of the Inspector. The Inspector, upon notification, shall make the requested inspections and shall either indicate in writing that portion of the construction is satisfactory as completed, or shall notify the Contractor that same fails to comply with plans and specifications. Any portions of Work that do not comply shall be corrected by the Contractor, and such portion shall not be covered or concealed until authorized by the Inspector.

1. There shall be a final inspection and approval of all buildings and structures when completed and ready for occupancy and use.

D. Inspection Coordination: Contractor shall provide, on a weekly basis, an anticipated Inspection Requirements Schedule, coordinated with the three-week look ahead schedule, showing the anticipated inspection needs for the following three weeks to facilitate appropriate campus coordination and interface as well as mobilization of required inspection staffing.

E. Required Inspections: Reinforcing steel, structural framework, or interior wall and/or ceiling support framing of any part of any building or structure shall not be covered or concealed without first obtaining the approval of the Inspector.

1. Listed below are the minimum inspection requirements:

    a. Frame Inspection: To be made after all framing, fire blocking and bracing are in place and all pipes and vents are complete and the rough electrical, plumbing and heating wires, pipes and ducts are approved.
    b. Mechanical and Electrical Rough-In Inspection: To be made after all mechanical and electrical rough-in work is completed.
    c. Lath or Gypsum Board Inspection: To be made after all lathing and gypsum board, interior and exterior, is in place, but before any plastering is applied or before gypsum board joints and fasteners are taped and finished.
    d. Final Inspection: To be made when the building is completed and ready for occupancy.
    e. Other Inspections: In addition to the called inspections specified above, the inspector may make or require other inspections of any construction work to ascertain compliance with the provisions of the plans and specifications.
    f. Re-inspections: A re-inspection fee may be assessed for each inspection or re-inspection when such portion of work for which inspection is called is not complete or when corrections called for are not made.

(ARCHITECT TO REVISE/ ADD TO LIST AS REQUIRED BY PROJECT TECHNICAL DETAILS)

    g. Footings
    h. Underground utilities
    i. Rebar
    j. Fire sprinklers.
    k. Ceiling above t-bar
    l. Welding
    m. Roof/metal deck
    n. Roofing
    o. Insulation
    p. Rated wall penetrations
    q. Rated doors and access panels
    r. High voltage cable installation
    s. High pot high voltage cables

2. The Contractor shall be responsible for reviewing all of the Contract Documents for any additional inspection requirements.

1.6 SUBMITTALS

A. Reports: University' independent testing agency shall submit a certified written report of each inspection, test or similar service, to the University. Comply with the general requirements for submittals as per Section 01 33 00 Submittals Procedures.

B. Report Data: Written reports of each inspection, test or similar shall include, but not be limited to:

    a. Date of issue
    b. Project title and number.
    c. Name, address and telephone number of testing agency
    d. Dates and locations of samples and tests or inspections
    e. Names of individuals making the inspection or test
    f. Designation of the Work and test method
    g. Identification of product and Specification Section
    h. Complete inspection or test data

i. Test results and an interpretation of test results
j. Ambient conditions at the time of sample-taking and testing
k. Comments or professional opinion as to whether inspected or tested
l. Work complies with Contract Document requirements
m. Name and signature of laboratory inspector
n. Recommendations on retesting.

1.7 SCHEDULES FOR TESTING

A. Testing and Inspection Schedule: After discussion with University's Representative and Testing Laboratory in advance of performance of testing and inspection services, Contractor shall determine dates and times necessary for Testing Laboratory to schedule performance of required tests and inspections and determine due dates for issuance of reports.

1. Integrate Testing and Inspection Schedule with Construction Progress Schedule specified in Section 01 32 00- Construction Progress Schedules and indicate in the Inspections List submittal in Section 01 45 00 – Quality Control and Inspections.

2. Determine and indicate in Testing and Inspection Schedule necessary time for preparation and submission of reports of tests and inspections.

B. Revising Testing and Inspection Schedule: When changes of the construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. Adherence to Testing and Inspection Schedule: When the Testing Laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributed to the delay may be back-charged to the Contractor and shall not be borne by the University.

1.8 CONTRACTOR'S RESPONSIBILITIES

A. Contractor's Responsibilities for Inspections and Tests:

1. Notify Project Inspector and Testing Laboratory two working days in advance of expected time for operations requiring inspection and testing services.

2. Deliver to Testing Laboratory or designated location, adequate samples of materials proposed to be used which require advance testing, together with proposed mix designs.

3. Cooperate with University's Representative, Testing Laboratory, Project Inspector, Architect, Architect's consultants and other responsible design professionals. Provide access to Work areas and off-site fabrication and assembly locations, including during weekends and after normal work hours.

4. Provide incidental labor and facilities to provide safe access to Work to be inspected and tested, to obtain and handle samples at the Work site or at source of products to be tested, and to store and cure test samples.

5. Provide at least 15 days in advance of first inspection or test of each type, a schedule of tests or inspections indicating types of tests or inspections and their scheduled dates.

6. Provide two working days notice to University's Representative, Architect and, as applicable, responsible design consultant, of each test and inspection.

1.9 INSPECTIONS TESTS BY OTHERS

A. Inspections by Others: Refer to Section 01 45 00 - Quality Control and Inspections and individual product Specifications Sections for requirements regarding tests and inspections by product manufacturers and others, including serving utilities and for requirements regarding observations and inspections by University's Representative, Architect and Project Inspector.

PART 2 – PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 REPAIR AND PROTECTION

A. Repair and Protection: Upon completion of inspection, testing, sample-taking and similar services, repair damaged construction and restore substrates and finishes to eliminate deficiencies, including deficiencies in visual qualities of exposed finishes. Comply with Contract Document requirements for "Cutting and Patching."

1. Protect construction exposed by or for quality control service activities, and protect repaired construction.

2. Repair and protection is the Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing or similar services.

END OF SECTION

SECTION 01 51 00: TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Temporary utilities and services, including:

1. Heating and cooling during construction
2. Ventilation during construction
3. Temporary water service
4. Temporary sanitary facilities
5. Temporary power and lighting
6. Construction telephone service.

B. Removal of temporary utilities.

1.3 RELATED SECTIONS

A. Contract General Conditions
B. Supplementary Conditions and Special Conditions
C. Section 01 35 50 – Safety Procedures
D. Section 01 41 00 – Regulatory Requirements
E. Section 01 52 00 – Construction Area and Temporary Facilities

1.4 SUBMITTALS

A. Temporary Utilities Site Plan: Show all temporary utility hook-up locations on an approved site plan background drawing that is to scale, neat, and legible.
   a. Due within 21 Days of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. During the course of construction, submit any proposed revisions for approval prior to implementing any changes.

B. Temporary Utilities Reports: Submit reports of tests, inspections, applicable meter readings (monthly) and similar procedures performed on temporary utilities.

1.5 TEMPORARY UTILITIES AND SERVICES

A. Temporary Utilities and Services, General: All utilities and other services necessary for proper performance of the Work shall be provided and paid for by Contractor, unless specifically noted otherwise. Refer to Contract General Conditions 4.11. Temporary utilities and services shall conform to all applicable regulatory requirements of authorities having jurisdiction and serving utility companies and agencies. Where temporary utilities require the services of a registered design professional, those shall be provided by the Contractor. The Architect and their consultants are not responsible for temporary utilities.

B. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits, including permits for temporary generators, from authorities having jurisdiction.

C. Temporary Connections and Fees: Contractor shall arrange for services and pay all fees and service charges for temporary power, water, sewer, gas and other utility services necessary for the Work.

D. Permanent Connections and Fees: Contractor shall arrange for utility agencies and companies to make permanent connections. University will arrange for permanent utility account and pay permanent connection fees. After Contract Completion review and determination that Work is acceptable, University will pay utility service charges for services delivered through permanent connections, for normal quantities.

E. Use of Temporary Utilities: Enforce strict discipline in use of temporary utilities to conserve on consumption. Limit use of temporary utilities to official uses to minimize waste and abuse.

1.6 PROJECT CONDITIONS

A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Take necessary fire prevention measures. Do not overload facilities, or permit them to interfere with progress. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on the site.

1.7 HEATING, COOLING, AND VENTILATION

A. Temporary Heating, Cooling, and Ventilation: Provide and pay for temporary heating, cooling, ventilation, and dehumidification devices, fuel and related service charges to provide ambient temperatures as required to maintain conditions necessary for proper performance of construction activities and to assist cure of materials, removal of moisture, and to prevent accumulation of dust, fumes, vapors, and gases.

B. Use of Permanent Heating, Cooling, and Ventilation Systems: Permanent heating, cooling, and ventilation equipment may not be used during construction. Those permanent systems, including ventilation only systems and all ducting must remain fully covered, sealed, and protected from dust and other potential sources of indoor environmental quality contamination. When the Work is clean and free of dust generating activity, the contractor may remove the covers and make all final connections and begin the start-up, testing, and acceptance process. If after this has been complete, there is to be any further dust generating work, those systems shall be re-covered and sealed prior to such activity.

1.8 TEMPORARY WATER SERVICE

A. Temporary Water Service: Locate and connect to existing water source for temporary construction water service, as acceptable to University's Representative. Extend branch piping to outlets located within the Work Area. Install a meter so the volume of water used during the course of construction may be monitored. Temporary water service piping, valves, fittings and meters shall comply with requirements of the University and applicable regulations.

B. Use of Permanent Water System: Permanent water system may be used for construction water after completion, sterilization, testing and inspection of system and approval by University's Representative and authorities having jurisdiction.

1.9 TEMPORARY SANITARY FACILITIES

A. Temporary Sanitary Facilities: Provide and maintain adequate temporary sanitary facilities and enclosures for use by construction personnel within the Work area. Comply with regulatory requirements for the type, size, quantity, and location of temporary toilet facilities. Provide wash-up sink with soap, towels and waste disposal.

B. Use of Permanent Sanitary Facilities: Do not use permanent sanitary facilities unless approved by University's Representative in writing. Immediately prior to Contract Completion review, thoroughly clean and sanitize permanent sanitary facilities used during construction.

1.10 TEMPORARY POWER AND LIGHTING

A. Temporary Power: Provide electric service as required for construction operations. Where available and approved, the Contractor may connect to existing campus power service using a method approved by the University and in compliance with all regulatory requirements.
   1. Temporary power conduit, raceways, fittings, conductors, panels, connections, disconnects, overcurrent protection, outlets and meters shall comply with requirements of the serving electric utility, California Electrical Code (CEC), Pacific Gas & Electric, and requirements of authorities having jurisdiction.
   2. As necessary in order to maintain construction progress, Contractor shall provide and pay all costs associated with generators used for temporary power.

A. Temporary Lighting: Provide temporary lighting as necessary for proper performance of construction activities and for adequate illumination for observations, inspections, safety, and security throughout the duration of construction activities.
   1. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required. Maintain lighting and provide routine repairs.

B. Protection: Provide weatherproof enclosures for power and lighting components as necessary. Provide overcurrent and ground-fault circuit protection, branch wiring and distribution boxes located to allow convenient and safe service about site of the Work. Provide flexible power cords as required.

C. Use of Permanent Power and Lighting Systems: Permanent power and lighting systems may be used after completion, testing and inspection of systems and approval by University's Representative and authorities having jurisdiction. Contractor shall maintain lighting and make routine repairs and replacements as necessary.

D. Service Disruptions: Temporary power connections shall not disrupt service to other University operations. Schedule any proposed temporary shut-downs at times convenient to University, which may be outside of normal work hours or days. Submit request not less than 7 Days prior to proposed shut down.

1.11 CONSTRUCTION TELEPHONE SERVICE

A. Construction Telephone Service: Provide telephone service to Contractor's field staff by means of cellular telephones to enable communications between University's Representative, Project Inspector and Contractor as well as for emergency purposes.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

A. Materials and Equipment: For all temporary utilities, provide materials that are suitable and serviced for the use intended. Their use and methods of installation shall not create unsafe conditions or violate requirements of applicable codes and standards.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITIES INSTALLATION

A. Temporary Utilities Installation, General: Contractor shall engage the University and appropriate local utility company or personnel to install temporary service or connect to existing service. Work on temporary utilities shall not occur until after Temporary Utility Site Plan submittal has been approved. Any proposed changes to the plan must be submitted for approval prior to implementation. Use charges for temporary facilities are the Contractor's responsibility. Contractor shall install meters and reimburse the University for any electricity and/or water used from a University source.

B. Maintenance of Temporary Utilities and Services: Contractor shall maintain temporary utilities and services in good operating condition until removal. Contractor shall protect from utilities and services from environmental and physical damage.

3.2 TERMINATION AND REMOVAL OF TEMPORARY UTILITIES AND SERVICES

A. Termination and Removal of Temporary Utilities and Services: Unless the University requires that it be maintained longer, remove each temporary facility when the need has ended, or when replaced by authorized use of a permanent facility, or no later than Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Prior to Completion, clean and renovate permanent facilities that may have been used during the construction period.

B. Clean exposed surfaces and repair damage caused by installation and use of temporary utilities and services. Remove temporary underground utility installations fully. Backfill, compact and regrade site as necessary to restore areas or to prepare for indicated paving and landscaping. Restore paving damaged by temporary utilities. Refer to requirements specified in Section 01 73 20 - Cutting and Patching.

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 01 52 00: CONSTRUCTION AREA AND TEMPORARY FACILITIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Temporary Construction Area facilities and submittal requirements.

1.3 RELATED SECTIONS

A. Section 01 35 00 – Environmental Protection: For stormwater pollution prevention.
B. Section 01 35 50 – Safety Procedures
C. Section 01 51 00 - Temporary Utilities: Water, power, telephone, and sanitary services.
D. Section 01 55 00 – Vehicular Access and Parking.
E. Section 01 74 00 - Cleaning Requirements: Cleaning during construction and final cleaning.

1.4 SUBMITTALS

A. Construction Area Plan: Show all temporary construction facilities on an approved site plan background drawing that is generally to scale, neat, and legible to fit on paper size not larger than 24” x 36”. It may be hand-drawn or use computer graphics. The Contractor may utilize the Construction Area Map Exhibit from the Contract Documents as a starting place.
   1. Due within **21 Days** of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes.
   2. The Construction Area Plan shall include, at a minimum, the following elements:
      a. Construction area and staging
      b. Contractor’s field office
      c. Temporary storage sheds
      d. Temporary utilities connections (See section 01 51 00)
      e. Temporary fencing and gates
      f. Temporary barriers and enclosures
      g. Temporary protection of installed Work
      h. Construction aids
      i. Traffic control elements (See section 01 55 00)
      j. Waste and recycling collection areas (See section 01 74 19)
   3. Construction Area Plan is a coordination drawing and must follow the general requirements for Shop Drawings as per Section 01 33 00 Submittal Procedures.

1.5 CONSTRUCTION AREA AND STAGING

A. Refer to the Construction Area Map Exhibit in the Contract Documents for the areas identified by the University as approved for use by the Contractor during the course of construction. Prior to mobilization on-site, the Contractor’s Construction Area Plan submittal must be accepted by the University.
   1. Use only site areas shown on the Construction Area Plan. Do not store materials, equipment, or other elements outside of this area.
   2. The locations of fencing may not necessarily align exactly with the Construction Area, but fencing shall not be placed outside of that area unless specifically approved for purposes of site safety or security.

3. Limited use of areas outside of the Construction Area for isolated short durations may be coordinated with the University, for approval, where special conditions are warranted. For example, parking a crane for a specific purpose for less than one day to stock trusses may be an acceptable use provided that if the equipment and safety clearances are taking up any existing parking facilities, the parking permit fees must be paid for in full by the Contractor.
    a. Submit complete proposal and justification for activities outside of the Construction Area no less than 10 Days prior to the planned date for such activities to occur. Provide more advance notice where necessary based on the type, complexity, and duration of the activity.
    b. Under no circumstances shall the Contractor be entitled to an increase in Contract Sum or Time in relation to the University's approval or rejection of any such proposals.
    c. Coordinate activities outside of the Construction Area with all other project requirements and regulations as well as emergency services access requirements.
    d. Do not cause disruption to ongoing University operations, and remove items from areas outside of Construction Area immediately after activity is complete.
4. The Construction Area shall be kept clear of trash and debris and in neat order. Materials and equipment shall be placed in an organized fashion.
5. Unless otherwise specified or indicated on the Drawings, during the construction period the Contractor shall have full use of the designated Project Area for construction operations, including use of the site. Contractor's use of Project Area shall be limited only by the Contractor's responsibilities to provide and maintain emergency access and egress as required by public safety authorities having jurisdiction and the University's right to perform construction operations with its own forces or to employ separate contractors on portions of the Project in accordance with the Contract General Conditions.

1.6 CONTRACTOR'S FIELD OFFICES

A. Contractor's Field Office: Contractor shall provide a mobile field office of weather-tight and secure construction, with lighting, power, ventilation, and heating where necessary and appropriate to conduct the management and coordination of the project and work activities.

1. Provide accommodations for the Contractor's desk workspace, Construction Document layout, and for a meeting table and chairs for not less than six persons.
2. Provide a computer with cellular internet connection and a photocopier, printer, and fax machine in good working order.
3. The University and inspectors may also utilize this field office and the furnishings and equipment listed above during work hours for its purposes related to the Project, but will not occupy this field office full-time.
4. Locate in the position shown in the accepted Construction Area Plan. If an alternate location is proposed, of if the unit is to be moved during the course of construction, simply provide an updated Construction Area Plan indicating the new location.
5. Contractor's Field Office shall present neat, clean, business-like appearance at all times, internally and externally, and shall not be used for living quarters.
6. Include other required elements for safety and fire protection, including UL rated portable fire extinguisher(s) as determined necessary by the Contractor and the authorities having jurisdiction
7. Maintenance: Use all means necessary to maintain construction facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage,

promptly restore temporary construction facilities by repair or replacement at no change in the Contract Sum or Contract Time.

1.7 TEMPORARY STORAGE SHEDS

A. Provide storage sheds where necessary and appropriate for of weather protection and security of tools, materials, and equipment.
   1. Locate in the position shown in the accepted Construction Area Plan. If an alternate location is proposed, of if the unit is to be moved during the course of construction, simply provide an updated Construction Area Plan indicating the new location.
   2. Do not store combustible or flammable materials near the Contractor's Field Office or the building under construction.
   3. Maintenance: Use all means necessary to maintain construction facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, promptly restore temporary construction facilities by repair or replacement at no change in the Contract Sum or Contract Time.

1.8 TEMPORARY FENCING AND GATES

A. Provide temporary portable chain-link fencing with windscreen around the Construction Area.
   1. Locate in the position shown in the accepted Construction Area Plan. If an alternate location is proposed, of if the unit is to be moved during the course of construction, simply provide an updated Construction Area Plan indicating the new location.
   2. Provide access gates for personnel, equipment, and vehicles as necessary. Such access points shall be made secure with latches and locks in a manner that is appropriate for both safety and security.
   3. Coordinate with the University for procedures with regard to access rights and restrictions. The Contractor shall ensure no unauthorized persons enter the Construction Area.
   4. Fencing shall be no less than standard 2 inch 11-gauge, galvanized steel, with galvanized pipe posts with caps, at 8 feet high minimum. Post bases shall either be set in temporary concrete footings or use galvanized steel bases located to prevent the risk of tripping.
   5. Windscreen fabric shall be standard fabrication in forest green color to provide visual screening of the Work activities and must be securely fastened on the outside face of the chain link.
   6. Design and construction of fencing is the responsibility solely of the Contractor. The specifications provided here are to establish the minimum requirements only. Do not install any fencing in such a way as to be of safety or security hazard. If during storm events the wind force exceeds the ability of the fence to remain secure, provide immediate measures to remove the windscreen.
   7. Maintenance: Use all means necessary to maintain construction facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, promptly restore temporary construction facilities by repair or replacement at no change in the Contract Sum or Contract Time.

1.9 TEMPORARY BARRIERS AND ENCLOSURES

A. Provide temporary barriers, guardrails, covered passageways, and enclosures as necessary to provide for public safety, to prevent unauthorized entry to construction areas and to protect new work, existing facilities and adjacent properties, including existing trees and vegetation from damage from construction operations.
   1. Comply with all applicable codes and safety regulations.

2. Locate in the position shown in the accepted Construction Area Plan. If an alternate location is proposed, of if the unit is to be moved during the course of construction, simply provide an updated Construction Area Plan indicating the new location. Where the placement of a barrier or enclosure is a matter of immediate safety, the Contractor shall act immediately and coordinate with the University as early as practical.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire protection facilities, stairways, and other access routes for firefighting.
4. Maintain unobstructed access to adjacent facilities which are occupied and in use by the University during construction.
5. Paint temporary barriers and enclosures or otherwise provide with appropriate colors, graphics, and warning signs to inform personnel and public of possible hazard. Include an acceptable detour route and signage with direction indicators.
6. Where appropriate and necessary, provide warning lighting, including flashing red or amber lights.

B. Passageways: Erect structurally adequate, protective, covered walkways, tunnels, overhangs, or partitions for passage of persons to maintain access and emergency egress for occupied facilities. Such elements may be in both interior and/or exterior locations.
   1. Comply with all applicable codes and safety regulations.
   2. Locate in the position shown in the accepted Construction Area Plan. If an alternate location is proposed, of if the unit is to be moved during the course of construction, simply provide an updated Construction Area Plan indicating the new location. Where the placement of a barrier or enclosure is a matter of immediate safety, the Contractor shall act immediately and coordinate with the University as early as practical
   3. Access to all adjacent buildings, sidewalks, driveways, and drop-off points must remain ADA/Title 24 accessible at all times.
   4. Protect all vehicles, pedestrian and vehicular traffic from damage or injury.
   5. Design and construction of passageways is the responsibility solely of the Contractor. The specifications provided here are to establish the minimum requirements only. Do not install any passageways or covers in a way that may be a safety or security hazard.
   6. Provide proper anchorage to resist all applicable loads.
   7. Provide temporary lighting where necessary for maintaining minimum illumination levels for egress. Lighting shall be controlled by photocell or timer if appropriate lighting levels do not require lighting fixtures to be on during daylight hours. See Section 01 51 00 - Temporary Utilities.
   8. Provide all requires exit signs and other directional signage.
   9. Where necessary, as ultimately determined by the authorities having jurisdiction, and under the Contractor's responsibility to comply with all applicable codes, standards, and regulations, the Contractor shall provide a registered design professional licensed in the State of California to complete the designs for covered passageways and other barriers or enclosures. Where a permit is required, it shall be provided and paid for in full by the Contractor without any increase in Contract Time or Sum.
   10. Any temporary covered passageways or barriers shall be neat and professional in appearance. Walls shall be plumb and straight, edges shall be aligned, intersections of materials shall be tight and regular. Raw plywood or other wood materials is acceptable, but it shall be painted a University standard color if they are to be used in place for more than 7 Days unless otherwise coordinated with and approved by the University.
   11. Use all means necessary to maintain construction facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, promptly

restore temporary construction facilities by repair or replacement at no change in the Contract Sum or Contract Time.

C. Exterior Enclosures: Provide temporary weather-tight closure of exterior openings to:
   1. Achieve acceptable working conditions.
   2. Protection of building and materials from weather damage.
   3. Prevent entry of unauthorized persons or vehicles.
   4. Provide access doors with self-closing hardware and locks.

D. Interior Enclosures: Provide temporary partitions and ceilings as required to separate work areas from areas already completed, to prevent penetration of dust and moisture into adjacent areas, to provide security, and to prevent damage to materials and equipment.

E. Protection of Work: Provide for the protection of all installed Work.
   1. Provide protection that is appropriate to the phase and exposure of the work and materials stored on site. Provide storage sheds as specified where necessary.
   2. Provide temporary floor surfacing, subject to the approval of the University, and maintain such surfacing wherever Contractor's personnel are working at finished surfaces to prevent dents, scratches, rust, stains, damage from construction debris. Such areas shall be cleaned daily to the satisfaction of the University, prior to Contractor's cessation of the work each day.

1.10 CONSTRUCTION AIDS

A. Provide all necessary construction aids including, but not limited to debris chutes, temporary stairs, scaffolding, fall protection anchors, and other elements as required for the construction.
   1. Design and construction aids is the responsibility solely of the Contractor. The specifications provided here are to establish the minimum requirements only. Do not install any construction aids in a way that may be a safety or security hazard.
   2. Use all means necessary to maintain construction facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, promptly restore temporary construction facilities by repair or replacement at no change in the Contract Sum or Contract Time.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION

3.1 INSTALLATION OF TEMPORARY FACILITIES

A. Place temporary facilities after Construction Facilities Site Plan submittal has been approved and coordinated with the requirements above and with all other Sections.

B. Use all means necessary to maintain construction facilities in proper and safe condition throughout progress of the Work. In the event of loss or damage, promptly restore temporary construction facilities by repair or replacement at no change in Contract Sum or Time.

3.1 REMOVAL OF TEMPORARY FACILITIES

A. Removal of Construction Facilities: Unless otherwise mutually agreed by University's Representative and Contractor, remove all temporary materials, equipment, services, and construction prior to Contract Completion review.

B. Cleaning and Repairs: Clean and repair damage caused by installation or use of temporary construction facilities on public and private rights-of-way. Replace any landscaping and mulch as to the satisfaction of the University so that it is in a condition equal to or better than the condition prior to the start of Work.

C. Where there is a loss in value of trees due to damage that cannot be replaced, the Contractor shall be liable and provide compensation for

a. Because of irreplaceable nature of many existing trees, amount of assessment shall be determined by University's Representative after consultation with Certified Arborist, and shall depend upon tree species, condition before damage and location value.

b. Disputed sums shall be governed by applicable provisions of the Contract General Conditions.

c. If any tree pruning is deemed necessary by the Contractor in order to perform the intended Work, a written proposal shall be submitted to the University for review and approval prior to the work being implemented. Any tree trimming or pruning without the University's approval shall be considered as damage requiring repair, replacement, or compensation.

END OF SECTION

SECTION 01 54 00: SECURITY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Contractor Security requirements.

1.3 RELATED SECTIONS

A. Section 01 35 50 – Safety Procedures: General relationship between safety and security.
B. Section 01 51 00 – Temporary Utilities: For temporary lighting related to security.
C. Section 01 52 00 – Construction Area and Temporary Facilities: For fencing, construction aids and related elements.

1.4 SUBMITTALS

A. Security Program: Develop and submit a Security Program for the University's review and comment. Incorporate all corrections until a final Security Program is approved.
   a. Due within **21 Days** of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes.
   b. The Security Program shall be in the form of a written document demonstrating compliance with the elements of the Contract General Conditions, this Section, and other related Sections and project requirements.
   c. Coordinate the Security Program with the Construction Area Plan submittal.

1.5 SECURITY

A. In addition to security requirements contained in the Contract General Conditions (Article 4.08-c), Contractor shall adhere to the following requirements for security:

1. Contractor shall protect the Work from theft, vandalism an unauthorized entry. Contractor shall have sole responsibility for job site security.

2. Contractor shall maintain security throughout construction until the University's occupancy or acceptance.

3. Keying. Contractor shall provide construction keying different from permanent keying of locks and include organized, locked and supervised storage for receiving and dispensing items of finish hardware throughout the construction.

4. Provide University and Inspector Access. Contractor shall provide the University with keys necessary to gain access to locked areas of the Work. The University will be responsible for such keys and will return them to the Contractor upon acceptance of the project as complete.

1.6 ENTRY CONTROL

A. Contractor shall restrict entrance of persons and vehicles into project site to persons identified by the University as authorized to enter. Verify proper identification of such persons.

B. Implement temporary facilities to physically restrict entrance of unauthorized persons and vehicles into project site and existing facilities to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1.7 PERMANENT KEYS

A. Immediately upon receipt of permanent keys for whatever purpose (finish hardware, mechanical equipment, casework, dispensers, lockers, switches, equipment items, etc.), Contractor shall tag or otherwise clearly identify keys according to one approved system and turn them over to the University's Representative prior to any opportunity of access to keys by parties other than the University.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 55 00: VEHICULAR ACCESS AND PARKING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements for vehicular access to Work areas

B. Requirements for construction parking

1.3 RELATED SECTIONS

A. Section 01 52 00 – Construction Area and Temporary Facilities: Coordination of access to field office, sheds, fencing, etc.
B. Section 01 58 00 - Project Identification and Signage: Directional and informational signage.

1.4 SITE ACCESS

A. Site Access: Use of designated existing on-site streets and driveways for construction traffic is permitted with restrictions.
    1. Review access routes with University Representative and comply with directions.
    2. Vehicles may use only designated routes and access points.
    3. Coordinate w/ Construction Area Plan submittal, Section 01 52 00 Construction Area and Temporary Facilities.
    4. Metal - tracked vehicles shall not use any paved areas on University property.
    5. Provide unimpeded access for emergency vehicles.
    6. Provide and maintain access to fire hydrants free of obstructions.
    7. Sweep streets and driveways daily or as necessary. Coordinate with pollution prevention, sediment, and erosion control measures.
    8. Clean and restore paving and other site features after construction use, where damage was the result of the Contractor's use, even for streets, driveways, sidewalks, and other such elements that are outside of the designated Construction Area.

B. Traffic Control:
    1. Contractor shall comply with all on-campus and off-campus traffic regulations, including speed limits. Contractor shall pay all parking and traffic fines.
    2. Temporary blockage of site roadways and access to site parking lots and parking structures shall be only with approval of University's Representative. See Section 01 52 00 Construction Area and Temporary Facilities for additional requirements.
    3. Contractor shall employ trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on vehicular and pedestrian traffic lanes.
    4. Provide signage, cones and other suitable devices to direct traffic. Use lights during hours of low visibility to delineate traffic lanes and to guide traffic where necessary.
    5. Large vehicles shall have University public safety escort. Provide minimum 48 hours written notice through University Representative.
    6. Contractor shall comply with all safety regulations.

1.4 TRAFFIC SIGNS AND SIGNALS

A. Traffic Signs and Signals:
1. Provide temporary signs and signals as required by authorities having jurisdiction and in compliance with University's requirements transmitted through University Representative.
2. Contractor shall relocate signs and signals as necessary during construction.
3. Indicate all traffic and pedestrian signs on the Construction Area Plan submittal per Section 01 52 00 – Construction Area and Temporary Facilities.
4. Signs must comply with Caltrans standards.

1.5 CONSTRUCTION PARKING

A. Construction Parking must comply with the following:

1. Contractor may park vehicles and construction equipment inside the designated Construction Area without obtaining campus parking permits.

2. Contractor shall obtain campus parking permits or pay a parking meter for all of its vehicles parked outside of Contractor's fenced construction areas.
a. Parking permits may be purchased from University Parking and Commuter Services, which maintains a Parking Kiosk on the north end of Rossow Street. General parking areas may also have daily parking pass machines where a passes may be purchased.
b. Purchase of a parking permit does not guarantee a parking space will be available.
c. Vehicles parked outside of the designated Construction Area without a parking permit, or with a permit but not the correct permit for the specific parking area, or without payment to the meter during regulated hours, or parked illegally in any way will be ticketed and may be towed.
d**. University Police patrol the campus enforcing traffic and parking.**
e. City of Arcata patrols parking meters and neighborhoods surrounding the campus and may issue citations for violations of their parking regulations.

3. University Parking Regulations may be found here: www.humboldt.edu/parking/regulations
a. It is the Contractor's responsibility to ensure all employees and subcontractors are fully aware of all parking enforcement regulations. There will be no exceptions made.
b. For any questions with regard to parking, contact parking@humboldt.edu or call (707)826-3773.
c. University Police may be contacted for non-emergency purposes at (707)826-5555.

PART 2 – PRODUCTS (Not Used)
PART 3 - EXECUTION

3.1 MAINTENANCE OF PARKING AND ACCESS ROADS

A. Maintenance: Maintain traffic and parking areas in a sound condition. Repair breaks, potholes, low areas, standing water and other deficiencies, to maintain paving and drainage in original or specified condition.

B. Cleaning of Roadways and Parking Areas: Keep public and private rights-of-way and parking areas clear of construction-caused soiling, dust and debris, especially debris hazardous to vehicle tires. Perform cleaning as frequently as necessary.

END OF SECTION

SECTION 01 58 00: TEMPORARY PROJECT SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Temporary project signage including informational signs.

1.3 RELATED SECTIONS

A. Section 01 35 00 – Environmental Protection: Coordination of signage for environmental protection.
B. Section 01 51 00 – Construction Area and Temporary Facilities: Coordination of signage locations.
C. Section 01 55 00– Vehicular Access and Parking: Coordination of signage w/ parking & traffic control
D. Section 01 74 19 – Waste Management and Recycling: Coordination of signage associated with the Waste Management and Recycling Plan.

1.4 SUBMITTALS

A. Temporary Project Signage Submittal: In coordination with the Construction Area Plan submittal, which identifies the locations and types of signs for the purposes of construction, the Temporary Project Signage submittal shall include the graphic design and signage material information to demonstrate compliance with project requirements.
   1. Due within **21 Days** of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes.
   2. The Temporary Project Signage submittal shall include a copy of the signage graphics for all temporary signs to be used as part of the construction process, including, but not limited to the Project Identification Sign(s), traffic control signs, informational, and directional signs.

PART 2 - PRODUCTS

2.1 SIGN MATERIALS

A. Sign Structure and Framing: Contractor shall provide new materials, wood or metal, structurally adequate to support sign panel and suitable for specified finish.
B. Sign Surfaces: Sign surfaces shall be minimum 5/8-inch thick, exterior grade, softwood plywood with medium or high-density phenolic sheet overlay, standard large sizes to eliminate joints. Contractor shall provide sheet thickness as required to span across framing members and provide even, smooth surface without waves or buckles.
C. Hardware: Hardware shall be hot-dip galvanized steel.

2.2 PROJECT IDENTIFICATION SIGN

A. In addition to signage otherwise required, contractor shall provide not less than one project sign per General Conditions 4.23. The sign may be 3 feet by 5 feet securely mounted in an approved location. Submit sign graphics and proposed location for approval. The sign shall be of durable construction and quality graphics with no advertising.

i. Name of the Project;
ii. Description of the work;
iii. Name and/or logo the University;
iv. Name and/or logo the Contractor;
v. Name and/or logo of the Architect and their primary consultants;
vi. Contractor's field office phone number;
vii. University emergency phone number.

2.3 PROJECT INFORMATIONAL SIGNS

A. Restrictions: Contractor shall not display signs other than Project Identification Sign specified above and Project Informational Signs specified below without written approval of University's Representative.

B. Project Informational Signs: Informational signs, necessary for conduct of construction activities or required by governmental authorities having jurisdiction, may be displayed when in conformance to sign construction and graphic requirements specified in this Section.
   1. Adequacy of signage for safety and conformance to requirements of authorities having jurisdiction and trade practices shall be solely Contractor's responsibility.
   2. The University reserves the right to reject signage that does not meet the University's standards.

C. Sign Design: Informational signage shall be produced by professional sign painters or graphics designers and be of size and lettering style consistent with use. Colors shall be as required by authorities having jurisdiction and, if not otherwise required, of colors consistent with Project graphics. Where sign is related to vehicular access, comply with Caltrans standard details.

PART 3 – EXECUTION

3.1 TEMPORARY PROJECT SIGNAGE INSTALLATION

A. Project Identification Sign Construction: Construct sign support structure and install panels in durable manner, to resist high winds.
B. Project Identification Sign Installation: Erect Project Identification Sign on site at a lighted location of public visibility, adjacent to the main entrance to site, as approved by University.
   1. Contractor shall install sign at height for optimum visibility, on ground-mounted poles or attached to portable structure on skids.
   2. Portable structures shall resist overturning force of wind.
C. Field Painting: Paint all surfaces and edges of sign face and support for finished appearance.

3.3 SIGNS MAINTENANCE

A. Signs Maintenance: Contractor shall maintain signs and supports in a neat, clean condition. Contractor shall repair all damage and weathering to structure, framing and signage.
B. Sign Relocation: Contractor shall relocate signs as required by progress of the work.

3.4 REMOVAL

A. Project Signage Removal: Contractor shall remove Temporary Project Signage when directed, but no later than at the Final Completion. Contractor shall coordinate removal with requirements specified in Section 01 51 00 – Construction Area and Temporary Facilities.

END OF SECTION

SECTION 01 60 00: PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. General requirements for products used for the Work, including:
   1. General characteristics of products
   2. Product options
   3. System completeness
   4. Transportation and handling requirements
   5. Storage and protection of products
   6. Installation of products.

1.3 RELATED SECTIONS

A. Section 01 33 00 - Submittals Procedures: Requirements applicable to submittals.
B. Section 01 41 00 - Regulatory Requirements: As applicable to product minimum requirements.
C. Section 01 42 00 - Reference Standards and Abbreviations: References to various standards, standard specifications, codes, practices and other requirements as they may apply to products.
D. Section 01 45 00 – Quality Control and Inspections
D. Section 01 63 00 - Product Substitution Requirements
E. Section 01 64 0 - Owner-Furnished Products
F. Other Sections as applicable

1.4 SUMMARY

A. Provide products as specified in the Contract Documents or as allowed by the Contract General Conditions and this Section.

B. See Contract General Conditions 5.03 (Product and Reference Standards), 5.04 (Shop Drawings, Samples, Equals, Substitutions), and 5.05 (Quality of Materials, Articles and Equipment).

1.5 GENERAL PRODUCT REQUIREMENTS

A. Products, General: "Products" include items purchased for incorporation in the Work, whether purchased for the Project or taken from previously purchased stock, and include materials, equipment, assemblies, fabrications and systems.
   1. Named Products: Items identified by manufacturer's product name, including make or model designations indicated in the manufacturer's published product data.

   2. Materials: Products that are shaped, cut, worked, mixed, finished, refined or otherwise fabricated, processed or installed to form a part of the Work.

   3. Equipment: A product with operating parts that are motorized or manually operated and require connections such as wiring or piping.

B. Specific Product Requirements: Specified requirements for products are minimum requirements. Refer to requirements of Section 01 45 00 - Quality Control and individual product Specifications Sections for specific requirements for products.

C. Product Selection: Provide products that fully comply with the Contract Documents, are undamaged and unused at installation. Comply with additional requirements specified herein in Article titled "PRODUCT OPTIONS".

D. Standard Products: Where specific products are not specified, provide standard products of types and kinds that are suitable for the intended purposes and that are usually and customarily used on similar projects under similar conditions. Products shall be as selected by Contractor and subject to review and acceptance by the Architect.

E. Product Completeness: Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect. Comply with additional requirements specified herein in Article titled "SYSTEM COMPLETENESS".

F. Code Compliance: All products, other than commodity products prescribed by Code, shall have a current ICC Evaluation Service (ICC ES) ESR. Such report may be used by the Building Official to verify products comply with code requirements, and establishes the acceptance criteria for identifying proper installation for code compliance upon completion. Refer to additional requirements specified in Section 01 41 00 - Regulatory Requirements. All products must conform to the Indoor Environmental Quality requirements under CalGreen and as for the LEED NC 4.0 Rating System.

G. Interchangeability: To the fullest extent possible, provide products of the same kind from a single source. Products required to be supplied in quantity shall be the same product and interchangeable throughout the Work. When options are specified for the selection of any of two or more products, the product selected shall be compatible with products previously selected.

H. Product Nameplates and Instructions:
   1. Except for required Code-compliance labels and operating and safety instructions, locate nameplates on inconspicuous, accessible surfaces. Do not attach manufacturer's identifying nameplates or trademarks on surfaces exposed to view in occupied spaces or to the exterior.

   2. Provide a permanent nameplate on each item of service-connected or power-operated equipment. Nameplates shall contain identifying information and essential operating data such as the following example:
      Name of manufacturer
      Name of product
      Model and serial number
      Capacity
      Operating and Power Characteristics
      Labels of Tested Compliance with Codes and Standards

   3. For each item of service-connected or power-operated equipment, provide operating and safety instructions, permanently affixed and of durable construction, with legible machine lettering. Comply with all applicable requirements of authorities having jurisdiction and listing agencies.

1.5 PRODUCT OPTIONS

A. Product Options: Refer to Contract General Conditions, Article 5.04. Provisions of Public Contract Code Section 03400 shall apply, as supplemented by the following general requirements.

B. Products Specified by Description: Where Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that has the specified attributes and otherwise complies with specified requirements.

C. Products Specified by Performance Requirements: Where Specifications require compliance with performance requirements, provide product(s) that comply and are recommended by the manufacturer for the intended application. Verification of manufacturer's recommendations may be by product literature or by certification of performance from manufacturer.

D. Products Specified by Reference to Standards: Where Specifications require compliance with a standard, provided product shall fully comply with the standard specified. Refer to general requirements specified in Section 01 42 00 - Reference Standards and Definitions regarding compliance with referenced standards, standard specifications, codes, practices and requirements.

E. Products Specified by Identification of Manufacturer and Product Name or Number:
   4. “Sole source”: No other product shall be accepted. Provide the specified product(s) of the specified manufacturer. This may occur in order to obtain a necessary item that is only available from one source. Products specified as “sole source” or “campus standard” anywhere within the Contract Documents have been found by the University that such particular material, product, thing, or service is designated by specific brand or trade name for one or more of the following reasons:
      1. In order that a field test or experiment may be made to determine the product’s suitability for future use.
      2. In order to match other products in use on a particular public improvement either completed or in the course of completion.
      3. In order to obtain a necessary item that is only available from one source.
      4 a). In order to respond to an emergency declared by a local agency, but only if the declaration is approved by a four-fifths vote of the governing board of the local agency issuing the invitation for bid or request for proposals.
      4 b). In order to respond to an emergency declared by the state, a state agency, or political subdivision of the state, but only if the facts setting forth the reasons for the finding of the emergency are contained in the public records of the authority issuing the invitation for bid or request for proposals.

   5. "Acceptable Manufacturers": Product(s) of the named manufacturers, if equivalent to the specified product(s) of the specified manufacturer, may be acceptable in accordance with the requirements specified herein in the Article titled "'OR EQUAL' PRODUCTS."

   6. Unnamed manufacturers: Products of unnamed manufacturers may be acceptable as follows:
      a. The phrase "or equal" shall be assumed to be included in the description of specified product(s), unless specifically stated that equals will not be accepted or considered, or if the product is specified as “sole source.” Equivalent products of unnamed manufacturers may be accepted in accordance with the "or equal" provision specified herein, below.
      b. If provided, products of unnamed manufacturers shall be subject to the requirements specified herein in the Article titled "'OR EQUAL' PRODUCTS."

   7. Quality basis: Specified product(s) of the specified manufacturer shall serve as the “basis of design” by which products by named acceptable manufacturers and products of unnamed manufacturers will be evaluated. Where characteristics of the specified product are described, where performance characteristics are identified or where reference is made to industry standards, such characteristics are specified to facilitate evaluation of products by identifying the

most significant attributes of the specified product(s).

F. Products Specified by Combination of Methods: Where products are specified by a combination of attributes, including manufacturer's name, product brand name, product catalog or identification number, industry reference standard, or description of product characteristics, provide products conforming to all specified attributes.

G. "Or Equal" Provision: Where the phrase "or equal" or the phrase "or approved equal" or abbreviation “OAE” is included, the requirements specified herein in titled "'OR EQUAL' PRODUCTS" shall apply.

H. Visual Matching: Where Specifications require matching a sample, the decision by the University on whether a proposed product matches shall be final. Where no product visually matches, but the product complies with other requirements, comply with provisions for substitutions for selection of a matching product in another category.

I. Selection of Products: Where requirements include the phrase "as selected from manufacturer's standard colors, patterns and textures", or a similar phrase, selections of products will be made by indicated party or, if not indicated, by the University and/or Architect.

1.6 "OR EQUAL" PRODUCTS

A. "Or Equal" Products: Products are specified typically by indicating a specified manufacturer and specific products of that manufacturer, with acceptable manufacturers identified with reference to this "or equal" provision. If Contractor proposes to provide products other than the specified products of the specified manufacturer, provisions of any relevant Supplementary General Conditions, Contract General Conditions Article 5.04-c, and Public Contract Code section 3400 shall apply. Submit complete product data, including drawings and descriptions of products, fabrication details and installation procedures. Include samples where applicable or requested.

1. Submit “or equal” products in accordance with Section 01 33 00 Submittal Procedures with all of the relevant product data, shop drawings, manufacturer’s instructions, etc, as well as a signed letter explaining the justification for the product being an equal as follows:
   a. A certification that the Contractor has reviewed the proposed products and has determined that the products are equivalent or superior in every respect to product requirements indicated or specified in the Contract Documents.
   b. A written, point-by-point comparison of characteristics of the proposed equal product with those of the specified product.
   c. A detailed description in written or graphic form as appropriate, indicating all necessary changes or modifications for other elements of the Work.
   d. An analysis of the “or equal’s” potential impact on the Construction Schedule.

2. Note: Products that meet the definition of an “or equal” should generally not result in any modifications or other elements of the Work or delay in the progress of the Work. Such conditions may be an indication that the proposed product should be submitted following the procedures for a Request for Substitution. Regardless, the Contractor shall coordinate installation and make changes to other work that may be required for the work to be complete with no cost to the University and no increase in Contract Time.

3. If, in the opinion of the University or Architect, the "or equal" product request is incomplete or has insufficient data to enable a full and thorough review of the proposed products, the proposed products may be summarily refused and determined to be unacceptable.

B. Product Substitutions: For products not governed by the "or equal" provision, comply with Request for Substitution provisions of the Contract General Conditions (Article 5.04-d, Substitutions) and requirements specified in Section 01 63 00 - Product Substitution Procedures.

1.7 SYSTEM COMPLETENESS

A. System Completeness
   1. The Contract Drawings and Specifications are not intended to be comprehensive directions on how to produce the Work. Rather, the Drawings and Specifications are instruments of service prepared to describe the design intent for the completed Work.
   2. It is intended that all equipment, systems and assemblies be complete and fully functional even though not fully described. Provide all products and operations necessary to achieve the design intent described in the Contract Documents.
   3. Refer to related requirements specified in Section 01 41 00 - Regulatory Requirements regarding compliance with minimum requirements of applicable codes, ordinances and standards.

B. Omissions and Discrepancies: Report to University, in the form of an RFI, immediately when elements essential to proper execution of the Work are discovered to be missing or containing any discrepancy in the Drawings and Specifications, or if the design intent is unclear.
See Section 01 34 00 Requests for Interpretation.

1.8 TRANSPORTATION, DELIVERY AND HANDLING

A. Manufacturer’s instructions and warranty: Comply with manufacturer's instructions and recommendations for transportation, delivery and handling, for full warranty compliance in addition to the general requirements listed below.

B. Transportation: Transport products by methods to avoid product damage.

C. Delivery:
   1. Schedule delivery to minimize long-term storage and prevent overcrowding construction spaces. Coordinate to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.
   2. Deliver products in undamaged condition in manufacturer's original sealed container or packaging system, complete with labels and instructions for handling, storing, unpacking, protecting and installing.

D. Handling:
   1. Provide equipment and trained personnel to prevent soiling, marring or other damage.
   2. Promptly inspect products on delivery to ensure that products comply with Contract Documents, quantities are correct, and to ensure that products are undamaged and properly protected.

1.9 STORAGE AND PROTECTION

A. Storage and Protection, General: Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
   1. Periodically ensure products are undamaged, and maintained under required conditions.
   2. Remove and replace products damaged by improper storage or protection with new products at no change in Contract Sum or Contract Time.

B. Inspection Provisions: Provide access for inspection and measurement of quantity or counting of units. See Contract General Conditions for procedures required for payment or partial payment for materials stored onsite or offsite.

C. Structural Considerations: Store heavy materials away from the structure in a manner that will not endanger supporting construction.

D. Weather-Resistant Storage:
   1. Store moisture-sensitive products above ground, under cover in a weather tight enclosure or covered with an impervious sheet covering. Provide adequate ventilation to avoid condensation. See Section 01 52 00 Construction Area and Temporary Facilities for placement of temporary sheds.

   2. Maintain storage within temperature and humidity ranges required by manufacturer's instructions. See Section 01 51 00 Temporary Utilities for providing temporary heating, cooling, dehumidification, and ventilation.

   3. For exterior storage of fabricated products, place products on raised blocks, pallets or other supports, above ground to not create ponding or misdirection of runoff.

   4. Store loose granular materials on solid surfaces. Prevent mixing with foreign matter.

E. Protection of Completed Work:
   1. Contractor shall provide barriers, substantial coverings and notices to protect installed Work from traffic and subsequent construction operations.

   2. Contractor shall remove protective measures when no longer required and prior to Contract Completion review of the Work.

   3. Contractor shall comply with additional requirements specified in Section 01560 - Temporary Barriers and Enclosures.

PART 2 – PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 INSTALLATION OF PRODUCTS

A. Installation of Products:
   1. Comply with manufacturer's instructions and recommendations for installation of products, except where more stringent requirements are specified or necessary due to Project conditions or are required by authorities having jurisdiction.
   2. Anchor each product securely in place, accurately located and aligned with other Work.
   3. Clean exposed surfaces and provide protection to ensure freedom from damage and deterioration at time of Contract Completion review.

END OF SECTION

SECTION 01 63 00: PRODUCT SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. General requirements applicable to substitutions of materials, products, equipment and systems.

1.3 RELATED SECTIONS

A. Section 01 33 00 – Submittal Procedures: for related requirements regarding submittals.
B. Section 01 61 00 - Product Requirements: for requirements regarding product options.

1.4 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. “Substitution:” Shall mean a product that is of lesser or greater quality or performance than the specified material or equipment in accordance with Contract General Conditions Article 5.04(d).
   a. This is distinct from a product that is determined to be “or equal” as described in Section 01 60 00 Product Requirements and per Contract General Conditions 5.04(c) Alternatives or Equals.

B. Substitutions may only be authorized by properly executed Change Order or Field Instruction including all associated costs including additional professional services where applicable. Comply with all procedures of the Contract General Conditions for proposing substitutions.

C. Substitutions shall not be considered when included in a normal product data submittal format, and the University and/or Architect’s approval of such a submittal containing substitutions without compliance with all required procedures shall not relieve the Contractor of their responsibility to comply with all Contract Documents.

1.5 REQUEST FOR SUBSTITUTION PROCEDURES

A. Request for Substitution Procedures: Comply with provisions of Contract General Conditions, Article 5.04 and the following.

   1. Contractor shall prepare a Request for Substitution and submit the request to University for review and acceptance.
      a. Submit the request for substitution electronically using form provided by or otherwise approved by the University.

   2. Requests for Substitution shall include complete product data, including drawings and descriptions, fabrication details and installation procedures. Include samples where applicable or requested. Such elements are to follow the same requirements as per standard submittals.

   3. Requests for Substitution shall also include appropriate product data for the specified product(s) of the specified manufacturer, suitable for use in comparison of characteristics of products.
      a. Include a written, point-by-point comparison of characteristics of the proposed substitute product with those of the specified product.

b. Include a detailed description, in written or graphic form as appropriate, indicating all changes or modifications needed to other elements of the Work and to construction to be performed by the University and by others under separate contracts with University that will be necessary if the proposed substitution is accepted.

4. Requests for Substitution shall include a statement indicating the substitution's effect on the Construction Schedule. Indicate the effect of the proposed substitution on overall Contract Time and, as applicable, on completion of portions of the Work for use by University or for work under separate contracts by University.

5. Requests for Substitution shall include detailed cost data, including a proposal for the net change, if any, in the Contract Sum. Set the format for cost data, if results in any proposed change to the Contract Time or Sum shall be based on the approved format for a Proposed Change Order.

6. Requests for Substitution may require approval from the authorities having jurisdiction. The burden for such requirements shall be on the Contractor for coordination and fees for.

7. If, in the opinion of the University and/or Architect, the Requests for Substitution is incomplete or has insufficient data to enable a full and thorough review of the intended substitution, the substitution may be summarily refused and determined to be unacceptable at no change in the Contract Time or Sum.

B. Contract Document Revisions:

1. Should a Contractor-proposed substitution or alternative sequence or method of construction require revision of the Contract Drawings or Specifications, including revisions for the purposes of determining feasibility, scope or cost, or revisions for the purpose of obtaining review and approval by authorities having jurisdiction, Architect or other consultant of University who is the responsible design professional may make revisions if approved in writing in advance by University.

2. Contractor shall pay the University for the costs associated with the additional services of the Architect, other responsible design professionals and University for researching and reporting on proposed substitutions or alternative sequence and method of construction. These costs may include travel, reproduction, long distance telephone and shipping costs reimbursable at cost plus usual and customary mark-up for handling and billing.

3. Contractor shall pay such fees whether or not the proposed substitution or alternative sequence or method of construction is ultimately accepted by University and a Change Order is executed.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 64 00: OWNER-FURNISHED PRODUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements and responsibilities for equipment/products which are to be furnished by the Owner (University), as well as those which are existing or planned for the future.

1.3 PRODUCT HANDLING

A. Protection: Contractor shall use means necessary to protect the materials of this Section before, during, and after installation and to protect completed Work, including products installed by others.

B. Replacements: In the event of damage, Contractor shall immediately repair all damaged and defective Work to satisfaction of University's Representative, at no change in Contract Time and Contract Sum.

PART 2 - PRODUCTS

2.1 RESPONSIBILITIES FOR FURNISHING & INSTALLING PRODUCTS AND EQUIPMENT

A. Responsibility symbols may have been assigned to equipment/product items specified in other sections of these specifications and/or drawings in order to designate contract responsibility.

B. Regardless of responsibility symbol, Contractor shall:

a. Verify utility requirements. Upon request, the University shall provide dimensions and utility characteristics of University-furnished items.

b. Provide utility rough-ins for equipment/product items unless specifically noted as excluded from Contractor’s scope.

C. Responsibility Symbol Legend:

H - University (Owner or Trustees, all having the same meaning)
C - Contractor
E - Existing
F - Future

D. Responsibility Scenarios:

a. **H-H**: Furnished and installed by the University.

b. **H-C**: Furnished by the University and installed by the Contractor. The division of responsibilities is as follows:

   i. The University shall:
      1. Arrange for and deliver the University reviewed shop drawings, product data, manufacturer's instructions and other required information to the Contractor.
      2. Deliver supplier's bill of materials to the Contractor.
      3. Arrange and pay for delivery of item to site in accordance with Construction Progress Schedule; include all standard integral parts of equipment items.
      4. Inspect items upon delivery; submit claims for transportation damage and replace damaged, defective or deficient items that are declared by the Contractor at time of delivery.
      5. Arrange for manufacturer's warranties, inspections and service.

   ii. The Contractor shall:
      1. Designate submittals and delivery dates for each item in the Construction Progress Schedule.
      2. Review the University reviewed shop drawings, product data, manufacturer's instructions and other required information. Notify the Project Manager regarding any potential conflicts with the Contractor’s work.
      3. Receive and unload items at site and give written receipt for item at time of delivery, noting visible defects or omissions; if such declaration is not given, the Contractor shall assume responsibility for such defects and omissions.
      4. Handle and store items until ready for installation.
      5. Protect items from loss, damage, and from exposure to elements.
      6. Uncrate, assemble, install, connect, adjust, and finish items in accordance with the Contract Documents and the manufacturer's instructions and Shop Drawings.
      7. Supply the labor and all related materials, hardware, and accessories required and make all mechanical, electrical, plumbing, and structural reinforcement and connections necessary to operate the product or equipment.
      8. Furnish operating oils, lubricants and incidental materials required for complete installation.
      9. Provide installation inspections required by authorities having jurisdiction.
      10. Repair or replace items damaged after receipt.

c. **C-C**: Furnished and installed by the Contractor. **This is the default standard (without being specifically indicated) unless otherwise noted in drawings or specifications.**

d. **E-C**: Existing equipment to be relocated and installed by the Contractor.

   i. The Contractor shall:

1. Remove item from present location at a time approved by the University.
2. Disconnect and cap existing utilities as needed.
3. Relocate item to new location.
4. Install item. Provide fittings, fastenings, and similar items required to place equipment in operating condition to match condition immediately prior to removal, unless additional work is specifically noted in the Contract Documents.

e. **E-H:** Existing equipment to be relocated and installed by the University.
   i. The Contractor shall:
      1. Notify the University representative in writing of the need to relocate existing equipment in conflict with the construction work, a minimum of 21 days before the conflict impacts the project.

f. **F**: Future item furnished by the University and installed by the University.
   i. The Contractor shall**:**
      1. Maintain required clearances to accommodate item for its intended use; provide and install appropriate supports generally installed in conjunction with Contractor's work such as backing or anchors; and roughed-in connections for utilities.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to commencing Work, Contractor shall verify that Work specified in other Sections has been properly completed and installed as specified to allow for installation of all materials and methods required of this Section.

2. Contractor shall verify that new and existing products and conditions are satisfactory for installation or relocation of University furnished products. If unsatisfactory conditions exist, do not commence the installation until such conditions have been corrected.

B. Discrepancies:

1. In the event of discrepancy, Contractor shall immediately notify the University's Representative.

2. Contractor shall not proceed with installation in areas of discrepancy until all such discrepancies have been resolved.

3.2 INSTALLATION

A. Contractor shall relocate and reinstall existing products in accordance with Contract Documents and reviewed shop drawings, original manufacturer's instructions and recommendations if applicable and as directed.

B. Contractor shall install University furnished products in accordance with reviewed shop drawings and

manufacturer's printed instructions, as applicable.

3.3 ADJUSTING AND CLEANING

A. Contractor shall adjust all equipment and products as necessary and as directed by University's Representative.

B. Contractor shall clean all new, existing, and relocated equipment and products.

C. Contractor shall protect all new, existing, and relocated equipment and products from damage until Contract Completion.

END OF SECTION

SECTION 01 72 00: PREPARATION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements for preparation prior to installing, applying and placing products to determine acceptable conditions for the Work.

1.3 RELATED SECTIONS

A. Section 01 31 00 – Project Coordination: For proper sequencing and interfacing of the Work.
B. Section 01 31 20 - Project Meetings: General requirements for pre-installation conferences.
C. Section 01 32 00 - Construction Progress Documentation: Requirements for scheduling Work.
D. Section 01 73 20 - Cutting and Patching: To provide access for performing the Work.
E. Section 01 77 00 - Contract Closeout Procedures: Project record documents, including layout data.

1.4 LAYOUT OF WORK

A. Contractor is responsible for the correct layout and verification of the locations and elevations of buildings, site elements, and other components of the Work.
B. Where necessary, due to the scale and complexity of the Project requirements, and to aid in the avoidance of construction errors or improper coordination of the Work, the Contractor shall select and pay for services of a land surveyor, registered in the State of California.
C. Reviews by University and Architect of survey and layout data shall be only for general conformance with the design concept and requirements based on the information presented and shall not relieve the Contractor from compliance with requirements of the Drawings and Specifications. Changes shall only be authorized by separate written Change Order or Field Instruction, in accordance with the Contract General Conditions

PART 2 – PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Manufacturer's Requirements: Determine product manufacturer's requirements and recommendations prior to commencing Work.

B. Preparations: Perform preparation actions according to manufacturer's instructions and recommendations and according to specified procedures.
   1. Perform surface preparation as necessary to create suitable substrates for application, installation and placement of products.

C. Existing Utility Information: Furnish information to serving utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with University and with authorities having jurisdiction. Call for Underground Service Alert at 811 prior to any digging.

D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by University or others. See Section 01 51 00 Temporary Utilities.

E. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, Verify dimensions of other construction by field measurements before fabrication. coordinate fabrication schedule with construction progress to avoid delaying the Work.

F. Space Requirements: Verify space requirements of items shown diagrammatically on Drawings.

G. Review of Contract Documents and Field Conditions: Immediately upon discovery of the need for clarification of the Contract Documents, Submit an RFI to University. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

H. Verification of Construction Layout: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks, and locate survey reference points. If discrepancies are discovered, promptly notify University by submittal of an RFI.

3.2 CONTROL AND REFERENCE POINTS

A. Survey Control and Reference Points: Locate and protect survey control and reference points. Control datum for survey shall be as indicated on the Drawings or the separate survey provided by the University where not included in the services of the Architect.
   1. Comply with requirements of authorities having jurisdiction for survey monument preservation on capital improvement projects where monument points are present.
   2. Comply with all requirements of the Business and Professions Code Section 8771.

3.3 SURVEYING AND FIELD ENGINEERING SERVICES

A. Surveying and Field Engineering Services: Establish elevations, lines and levels for all Work under the Contract. Locate and lay out by instrumentation and similar appropriate means.

B. Note on Project Record Drawings utility locations, slopes and invert elevations as well as site improvements, including, but not limited to pavements, curbs, headers, sewers, storm drains, structures, and paving. See Section 01 78 90 Project Record Documents.

C. Provide and maintain stakes for cutting, filling, grading and topsoil placement, to establish finished grade or flow line indicated on Contract Drawings.

D. Lay out grid or axis for structures, building foundation, column locations and ground floor elevations.

E. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.

F. Establish dimensions within tolerances indicated. Do not scale Drawings.

G. Site Grading Verification: Upon completion of grading, survey graded areas and establish that elevations are correct and within acceptable tolerances for paving and finish grading.

H. Verification of Work: Periodically verify layout and completed conditions of the Work by same means.

END OF SECTION

SECTION 01 73 00: EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. General requirements for installing, applying and placing products.
B. General requirements for correction of defective Work.

1.3 RELATED SECTIONS

A. Section 01 31 20 - Project Meetings: Pre-installation and coordination conferences where procedures for installing and applying products are reviewed prior to performance of the Work.
B. Section 01 60 00 – Product Requirements: For general requirements of products and systems.
C. All other Sections: Specific requirements for installing, applying and placing products.

1.4 EXECUTION

A. Manufacturer's Requirements: Determine product manufacturer's requirements and recommendations prior to commencing Work.

B. Execution: Perform installation, application and placement actions according to manufacturer's instructions and recommendations and according to specified procedures.
   1. Perform surface preparation as necessary to create suitable substrates for application, installation and placement of products.
   2. Where required, provide temporary enclosures and devices to modify the environmental conditions until they are suitable for the installation requirements.

PART 2 – PRODUCTS (Not used)

PART 3 - EXECUTION

3.1 INSTALLATION, APPLICATION AND PLACEMENT OF PRODUCTS

A. Installation, Application and Placement, General: locate the Work and components of the Work accurately, in correct alignment, orientation and elevation, as indicated.
   1. Make vertical work plumb and make horizontal work level.
   2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
   3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
   4. Install products at the time and under conditions that will ensure the best possible results. maintain conditions required for product performance until acceptance of the Work.
   5. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

A. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

B. Anchors and Fasteners: provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
   1. Mounting Heights: Where mounting heights are not indicated, submit RFI.
   2. Allow for building movement, including thermal expansion and contraction.

C. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

F. Cleaning: Comply with requirements specified in Section 01 74 00 - Cleaning Requirements.

D. Protection: Provide barriers, covers and other protective devices as recommended by manufacturer and complying with general requirements specified in Section 01 52 00 – Construction Area and Temporary Facilities.

E. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.2 CORRECTION OF THE WORK

A. Correction of the Work, General: repair or remove and replace defective construction. Restore damaged substrates and finishes to match original and new surrounding construction.
   1. Comply with requirements in Section 01 73 20 - Cutting and Patching Procedures.
   2. Repairing shall include replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
   3. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
   4. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
   5. Remove and replace chipped, scratched, and broken glass.

B. Restoration of Existing Conditions: Restore permanent facilities used during construction to their original condition or to match new construction.

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 01 73 20: CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements and procedural requirements for cutting and patching, including:
   1. Cutting and patching existing construction to accommodate new construction.
   2. Cutting and patching existing construction damaged or defaced during construction as required to restore to existing or better condition at the time of award of Contract.
   3. Cutting and patching required to:
      a. Install or correct non-coordinated Work.
      b. Remove and replace defective and non-conforming Work.
      c. Remove samples of installed Work for testing.

B. Refer to other Sections and drawings for specific requirements of the extent and limitations applicable to cutting and patching, demolishing, or altering existing elements of the Work.
   1. Requirements of this Section also apply to mechanical and electrical installations, however, additional special procedures may be required for such systems.

1.3 RELATED SECTIONS

A. Section 01 31 00 - Project Coordination: Requirements for coordination among all divisions.
B. Section 01 33 00 – Submittal Procedures: Requirements for submittals and shop drawings.
C. Section 01 35 10 - Hazardous Materials Procedures: As applicable to any demolition activities.
D. Section 01 52 00 – Construction Area and Temporary Facilities: Dust-control barriers at cutting and patching locations.
E. Section 01 74 00 - Cleaning Requirements: Cleaning after cutting and patching Work.
F. All individual Divisions:
   1. Cutting and patching incidental to Work specified in the Section.
   2. Coordination with Work specified in other Sections for openings required to accommodate Work specified in those other Sections.

1.4 SUBMITTALS

A. Product Data and Coordination or Shop Drawings: Submit for approval all materials, products, or systems to be used in the cutting and patching for matching the existing conditions. Submit samples or mock-ups when requested in order to demonstrate the visual qualities of the matching finishes. Comply with Section 01 33 00 Submittals Procedures.

B. Written Request to Proceed for Cutting and Alteration:
   1. Submit written requests 5 Days minimum prior to planned activities which potentially affects:
      a. Structural integrity of any element of new or existing construction.
      b. Integrity of weather-exposed or moisture-resistant elements.
      c. Efficiency, maintenance, or safety of operational elements.
      d. Visual qualities of elements exposed to view in the completed construction.

e. Work by University's forces or by others under separate contract with University.
f. Existing construction not otherwise indicated to be revised by Work under the Contract.

2. Include in requests for cutting and alteration the following information:
   a. Identification of Project.
   b. Location and description of affected Work. Include shop drawings as necessary to identify locations and communicate descriptions and coordination clearly.
   c. Description of proposed Work and products to be used. Indicate all required submittals and their current status. All relevant required submittals should already be approved based on the required review periods, otherwise the cutting and patching may be delayed with no change to Contract Time or Sum.
   d. List possible alternatives to cutting and patching if there are such options.
   e. Indicate date and time cutting and patching Work will be performed, including duration.
   f. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.
   g. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service may be disrupted. Comply with the requirements of Section 01 51 00 Temporary Utilities.
   h. Where cutting and patching involves addition of reinforcement to structural elements, submit details to show how reinforcement is integrated with the original structure. This may include coordination drawings or engineered shop drawings by Contractor including engineering calculations and details.

3. Approval by the University to proceed with cutting and patching does not waive the University's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory. Minimize impact on University operations and on concurrent operations by other contractors.

1.5 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their gravity or lateral load-carrying capacity or load-deflection ratio.
   1. Obtain approval to proceed from the University for cutting and patching proposal prior to cutting and patching the following structural elements:
      a. Bearing and retaining walls
      b. Structural concrete
      c. Structural steel
      d. Headers
      e. Timber and primary wood framing
      f. Structural decking
      g. Stair systems
      h. Miscellaneous structural members
      i. Equipment supports
      j. Piping, ductwork, vessels and equipment

B. Operational and Safety Limitations: Do not cut and patch operating elements or safety-related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
   1. Obtain approval to proceed with the cutting and patching proposal prior to cutting and patching the following operating elements or safety-related systems, as applicable:
      a. Primary operational systems and equipment

b. Air or smoke barriers
c. Water, moisture, or vapor barriers
d. Membranes and flashings
e. Fire protection systems
f. Noise and vibration control elements and systems
g. Control systems
h. Communication systems
i. Electrical wiring systems

C. Visual Requirements: Do not cut and patch construction exposed on the exterior or interior occupied spaces, in a manner that would, in the Architect's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace work cut and patched in a visually unsatisfactory result.

D. Cutting and Patching Conference: Prior to proceeding, meet at the Project site with parties involved with the cutting and patching work. Follow the outline of procedures as required for pre-installation conferences per Section 01 31 20 Project Meetings. Review areas of potential interference or conflict. Coordinate all aspects of the Work and resolve potential problems.

PART 2 - PRODUCTS

2.1 PATCHING MATERIALS

A. Patching Materials, General: As required for patch and to match surrounding construction.
1. Provide same products or types of construction as that in existing structure, or specialized patching products as needed to extend or match existing.
2. Generally the Contract Documents will not define products or standards of workmanship present in existing construction; Determine products by inspection and necessary testing, and determine quality of workmanship by using existing as a sample for comparison.
3. The presence of a product, finish, or type of construction requires that patching, extending or matching shall be performed as necessary to make work complete and consistent with identical standards of quality.

B. Patching at Paving: At portland cement concrete paving, use concrete mix with maximum 3/8-inch aggregate and minimum 3000 psi 28-day compressive strength. Provide dowels to existing paving and reinforce new paving with minimum No. 4 reinforcing steel bars at 16-inches on center each way. Welded wire fabric reinforcement will not be acceptable.

C. Patching of Lawns and Grasses: Restore areas trenched, disturbed or damaged. Provide sod or seeded planting mix, to match existing lawn or grass area. Ensure successful growth.

D. Patching of Building Finish Materials: Match existing products and finishes. Confirm colors, patterns and textures with University. Custom cut new materials to fit and to match joint patterns with existing materials.

G. Refer to other Sections for additional requirements. Ensure compatibility of materials including coatings and paint products. See Painting specification section for surface preparation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examination, General: Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered. Inspect existing conditions prior to commencing Work, including elements subject to damage during cutting and patching.
   1. Before proceeding, meet at the site with parties involved in cutting and patching, including asbestos abatement, mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
   2. Proceeding with cutting or patching shall be clear indication to mean that existing conditions were found by Contractor to be acceptable. The University's approval to proceed shall not relieve the Contractor of their requirements to comply with all conditions of the Contract Documents.
   3. After uncovering existing Work, inspect conditions affecting proper accomplishment of Work.

3.2 PREPARATION

A. Temporary Supports: Provide supports to ensure structural integrity of the Work and provide devices and methods to protect other portions of Project from damage. Such Construction Aids shall be in accordance with Section 01 52 00 Construction Area and Temporary Facilities.

B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them. Ensure underground service alert (811) has been executed.

E. Weather Protection: Provide protection from elements for areas which may be exposed by uncovering Work. Maintain excavations free of water.

3.3 CUTTING AND PATCHING

A. Cutting and Patching, General: Execute cutting, fitting, and patching, excavation and fill, as necessary to complete the Work. Employ skilled workers. Proceed with cutting and patching at the earliest feasible time and complete without delay.
   1. Coordinate installation or application of products for integrated Work. Avoid having to cut and patch new substrates and finishes.
   2. Uncover completed Work as necessary to install or apply products out of sequence.
   3. Cut, remove and replace defective and non-conforming Work.
   4. Cut and patch as necessary to provide openings in the Work for penetration of plumbing, fire protection, HVAC and electrical Work.
   5. Where partitions are removed, patch floors, walls, and ceilings with finish materials to match.
      a. Where removal of partitions results in adjacent spaces becoming one, re-work floors and ceilings to provide smooth and clean planes without breaks, steps, or bulkheads. Finish must be consistent from floor to ceiling and corner to corner.
      b. Where extreme change of plane of one inch or more occurs, request instructions from

Architect as to method of making transition.

6. Trim and refinish existing doors as necessary to clear new floor finishes.
7. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

B. Cutting:
   1. Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations. Provide appropriate surfaces to receive final finishing.
   2. Execute cutting and patching of weather-exposed, moisture-resistant elements and surfaces exposed to view by methods to preserve weather, moisture and visual integrity.
   3. Cut rigid materials using carbide tip saw blades, diamond grit abrasive saw blades, diamond core drills and hole saws, and similar cutters for smooth edges. Do not overcut corners.
      a. Core drill holes through concrete and masonry.
      b. Pneumatic tools will not be allowed without prior approval.
   4. Provide fire and smoke seals as applicable at new penetrations to maintain fire rating.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances. Restore substrates and finishes with products to match existing construction and as specified in product Sections of the Specifications for new construction. :
   1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
   2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
      a. Where patching occurs in a painted surface, extend final paint coat over entire unbroken area containing the patch, after patched area has received primer and second coat.
   4. Patch, repair or re-hang existing ceilings as necessary to provide an even plane surface of uniform appearance.
   5. Finish surfaces flush and textured to match surrounding finishes.
   6. Fit work neat and tight allowing for expansion and contraction.
   7. Butt new finished to existing exposed structure, pipes, ducts, conduit, and other penetrations through surfaces.

D. Finishing: refinish surfaces to match adjacent and similar finishes as used for the Project.
   1. For continuous surfaces, refinish to nearest intersection or natural break.
   2. For an assembly, refinish entire unit.

E. Penetrations at Fire-Rated Construction: Verify if existing construction consists of fire rated assemblies. Submit RFI where unclear. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with firestopping and smoke seal material in compliance with an applicable UL-listed assembly, to full thickness of the penetrated element. Refer to specific Sections related to fire rated construction where applicable.

F. Restoration and Finishing: Finish surfaces to match adjacent and similar finishes.
   1. Restore Work with new products as specified in individual product Specifications Sections.

2. Patch and replace any portion of an existing finished surface which is found to be damaged, lifted, discolored, or shows other imperfections, with matching material.
   a. Provide adequate support of substrate prior to patching the finish.
   b. Refinish patched portions of painted or coated surfaces in a manner to produce uniform color and texture over the entire surface.
   c. When existing surface finish cannot be matched, refinish entire surface to nearest intersections.

G. Transition from Existing to New Construction:
   1. When new work abuts or finishes flush with existing work, make a smooth and clean transition. Patched work shall match existing adjacent work in texture and appearance so that the patch or transition is invisible at a distance of five feet.
   2. When finished surfaces are cut in such a way that a smooth and clean transition with the new work is not possible, notify Architect. Terminate existing surface in a neat manner along a straight line at a natural line of division, and provide trim appropriate to finished surface, or as otherwise directed by Architect.

H. Plaster Installation: Comply with manufacturer's instructions and install thickness and coats.

3.4 CLEANING

A. Cleaning: Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition. Comply with Section 01 74 00 Cleaning Requirements.

END OF SECTION

SECTION 01 74 00: CLEANING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Cleaning during construction.

B. Cleaning for Contract Completion review and final acceptance of the Work.

1.3 RELATED SECTIONS

A. Additional Requirements: Cleaning for specific products or elements of Work are described in individual Sections.

1.4 SUBMITTALS

A. Cleaning Product List & Procedures: Contractor shall submit complete list of all cleaning agents and materials as well as description of cleaning processes to be used for cleaning of the Work for University's review and approval.

1.5 QUALITY ASSURANCE

A. Cleaning and Disposal Requirements, General: Conduct cleaning and disposal operations in compliance with all applicable codes, ordinances and regulations, including environmental protection laws, LEED rating system requirements, and CalGreen mandatory measures.

B. Cleaning Workers: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a commercial building cleaning program.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents and Materials: Use only those cleaning agents and materials which will not create hazards to health or property and which will not damage or degrade surfaces. Comply with all applicable manufacturer’s recommendations and instructions.

PART 3 - EXECUTION

3.1 CLEANING DURING CONSTRUCTION

A. Garbage Control: Control accumulation of debris, waste materials and rubbish. Periodically, dispose of debris, waste and rubbish off-site in a legal manner and in accordance with construction

waste management and recycling requirements for this Project.

B. Cleaning of Existing Facilities: Contractor shall clean surfaces in existing buildings where alteration and renovation Work is being performed or where other construction activities have caused soiling and accumulation of dust and debris. Clean dust from horizontal and vertical surfaces, including lighting fixtures. Clean or replace HVAC filters. Note that all HVAC supply, return, or other registers must be properly covered and sealed prior to any potential dust generating activities.

C. Clean sidewalks, driveways, parking lots, streets, and Construction Area access ways frequently to maintain all thoroughfares free of dust, debris, soil, mud, and other contaminants, including any hazard which may be a threat to tires or feet. Coordinate activities with pollution, erosion, and sedimentation prevention requirements.

D. Cleaning Frequency: At a minimum, clean all Work areas daily. Coordinate cleaning activities with related project safety requirements.

E. Failure to Clean: Should cleaning by Contractor not be sufficient or acceptable to University's Representative, especially regarding paths of travel, University may engage cleaning service to perform cleaning and deduct costs for such cleaning from sums owed to Contractor.

3.2 CONTRACT COMPLETION REVIEW CLEANING, GENERAL

A. Contract Completion Review Cleaning, General: Execute a thorough cleaning prior to Contract Completion review by University and Architect. Contractor shall complete final cleaning before submitting final Application for Payment.
   1. Conduct cleaning in compliance with regulations of authorities having jurisdiction, industrial safety standards, CalGreen and LEED green building requirements for cleaning and indoor environmental quality.
   2. Employ professional building cleaners to thoroughly clean building.
   3. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Leave concrete floors broom clean. Vacuum carpeted surfaces.
   4. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
   5. Clean the site, including landscape development areas, of rubbish, litter and foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits.

B. Waste Disposal:
   1. Remove waste materials from the site and conduct disposal in a lawful manner.
   2. Do not burn or bury any materials.
   3. Do not discharge volatile, harmful or hazardous materials into drainage systems.
   4. Where extra materials of value remaining after completion of associated work have become the University's property, arrange for final relocation and stacking of these materials as directed in the location approved by the University.

3.3 INTERIOR CLEANING

A. Interior Cleaning:
   1. Remove labels that are not permanent labels.
   2. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign

materials from all visible interior and exterior surfaces.
3. Remove dust from all surfaces, including, but not limited to light fixtures, ledges, plumbing fixtures, tops of door and window frames, interiors of cabinets and casework.
4. Remove waste and surplus materials, rubbish and temporary construction facilities, utilities and controls per the requirements specified.

B. Accessories and Fixtures Cleaning: Clean building accessories, including toilet partitions, fire extinguisher cabinets, lockers and toilet accessories, all plumbing fixtures and all lighting fixture lenses and trim.

C. Glass and Mirror Cleaning: Clean and polish all glass and mirrors. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.

D. Metalwork: Clean and buff all metalwork, to be free of soiling and fingerprints. Mirror finished metalwork shall be buffed to high luster.

E. Floor Cleaning: Clean floors to dust-free condition, free of stains, films and similar foreign substances and implement the following minimum requirements for various types of floor surfaces:

1. Exposed concrete floors: Thoroughly sweep and wet mop floors in enclosed spaces. Contractor shall mop concrete floors and, at concrete floors in occupied spaces, apply floor finish as specified for resilient flooring. At unoccupied spaces, Contractor shall leave concrete floors broom clean.

2. Ceramic tile flooring: Thoroughly sweep and mop tile flooring. Comply with specific requirements in tile and installation materials manufacturers for cleaning materials.

3. Resilient flooring: Thoroughly sweep all resilient flooring. Contractor shall damp wash and wax (as appropriate) all resilient flooring. Comply with specific requirements in applicable resilient flooring Sections, and notes of the Drawings.

4. Carpet cleaning: Use a HEPA filtered vacuum and comply with accepted industry practices for cleaning commercial carpet, subject to review and acceptance by University. Spot clean and generally clean carpet using only approved carpet cleaning solution, scrubbers and solution extraction-type vacuuming equipment.

F. Ventilation System Cleaning: Replace filters and clean heating and ventilating equipment used for temporary heating, cooling and ventilation. See section 01 51 00 Temporary Utilities.

3.4 EXTERIOR CLEANING

A. Building Exterior Cleaning: Clean exterior of adjacent facilities where construction activities have caused soiling and accumulation of dust and debris.
1. Remove labels that are not permanent labels.
2. Wash down exterior surfaces to remove dust.
3. Clean exterior surfaces of mud and other soiling.
4. Clean exterior side of windows, storefronts and curtainwalls, including window framing.

B. Glass and Mirror Cleaning: Clean and polish all glass and mirrors. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass

and other damaged transparent materials.

C. Site Cleaning: Broom clean exterior paved surfaces. Rake clean other surfaces of the grounds.
   1. Wash down and scrub where necessary all paving soiled as a result of construction activities. Thoroughly remove mortar droppings, paint splatters, stains and adhered soil.
   2. Remove from the site all construction waste, unused materials, excess soil and other debris resulting from the Work. Legally dispose of waste.

3.5 PEST CONTROL

A. Pest Control: Contractor shall engage an experienced, licensed exterminator to inspect and rid the project area of insects, rodents and other pests immediately prior to Project Completion.
   1. Exterminator shall prepare and submit report of inspection and extermination.
   2. Extermination materials shall comply with applicable pest control regulations and University policy and not leave any residue which may be harmful to humans or wildlife.

3.6 CLEANING INSPECTION

A. Cleaning Inspection: Prior to Final Payment or acceptance by University for partial occupancy or beneficial use of the premises, Contractor and University's Representative shall jointly conduct an inspection of interior and exterior surfaces to verify that entire Work is acceptably clean.

B. Inadequate Cleaning: Should final cleaning be inadequate, as determined by University's Representative, and Contractor fails to correct conditions, University may engage cleaning service under separate contract and deduct cost from Contract Sum.

END OF SECTION

SECTION 01 74 19: WASTE MANAGEMENT AND RECYCLING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

1. Construction waste management and recycling requirements.

1.3 RELATED SECTIONS

A. Section 01 35 00 – Environmental Protection
B. Section 01 35 10 – Hazardous Materials Procedures
C. Section 01 52 00 – Construction Area and Temporary Facilities
D. Section 01 58 00 – Temporary Project Signage
E. Section 01 74 00 – Cleaning Requirements

1.4 SUBMITTALS

A. Waste Management and Recycling Plan: Develop and submit a Waste Management and Recycling Plan for the University's review and comment. This shall (at a minimum) incorporate all aspects of the Cal Green requirements per drawings A3.1 though A3.3. Note the requirements outlined in this specification section may exceed Cal Green requirements and in this case will supersede Cal Green requirements. Incorporate all corrections until a final Plan is approved.
   a. Due within **21 Days** of the Notice to Proceed. Make any required modifications and file the final approved submittal for the project records. Post in a conspicuous location on the Project Site and maintain a copy in the Contractor's Field Office. Post approved signage in the relevant locations in the Construction Area.
   b. During the course of construction, submit any proposed revisions for acceptance prior to implementing any changes.
   c. Waste Management and Recycling Plan shall be in the form of a written document demonstrating compliance with the elements of the Contract General Conditions, this Section, and other related Sections and project requirements.
   d. Coordinate the Waste Management and Recycling Plan with the Construction Area Plan submittal as per Section 01 52 00 Construction Area and Temporary Facilities.

B. Construction Waste Records: Implement Waste Management and Recycling Plan and maintain and submit records to demonstrate compliance. Use form approved by the University.
   a. Review drafts in-progress at each Construction Progress Meeting and prior to each Application for Payment.
   b. Submit final Construction Waste Records prior to Project Completion.

1.5 GENERAL REQUIREMENTS

A. Hazardous materials requirements are not included in this Section. Refer to Section 01 35 10 Hazardous Materials Procedures and the Contract General Conditions.

B. Develop and implement a Waste Management and Recycling Plan. Track all landfilled waste, salvaged, and recycled materials leaving the Construction Area. Record weights on approved form and submit with weight tickets/receipts. Maintain project site in sanitary and clean condition throughout the course of construction.

1.6 WASTE MANAGEMENT AND RECYCLING PLAN

A. Waste Management and Recycling Plan requirements:
   a. Develop and implement Construction Waste Management Plan that results in not less than 75% by weight of total demolition and construction waste generated by the Work. Note this is consistent with LEED Rating System and more restrictive than the General Conditions Section 4.3.g Integrated Waste Management.
   b. Plan shall include, at a minimum:
      i. List of types and estimated quantities of waste materials projected to be generated by the Work.
      ii. Identification of how each material will be disposed of, either by landfill or transfer station, recycling facility, or salvage.
      iii. List the names and locations of each of the above facilities.
      iv. Hauling and transportation procedures.
      v. Site diagram showing locations of materials collection and containers.
      vi. Site signage plan and container labeling for informing all site workers of Construction Waste Management Plan.
      vii. Waste Diversion Form for recording waste materials and recording weight tickets and landfill vs. recycling methods during the course of construction, to be updated and reviewed at each Construction Progress Meeting and prior to each Application for Payment.
      viii. Worker waste management & recycling training program outline.

1.7 WASTE MANAGEMENT AND RECYCLING REQUIREMENTS

A. Materials and equipment accruing from demolition of site elements, equipment, systems, buildings or structures or parts thereof, not identified to be retained by the University, shall be removed by the Contractor from the Project site and shall be disposed of by the Contractor at Contractor's expense, or shall be recycled or otherwise salvaged wherever possible.

B. All disposal shall be in compliance with local, State and Federal laws. Once an item has been removed for disposal, salvage, or recycling, it becomes the responsibility of the Contractor.

C. Garbage: Store garbage in covered containers, pick up daily and dispose of in a sanitary landfill.

D. Grading Spoil and Landscape Debris: Dispose of vegetation, weeds, rubble, and other materials removed by the clearing, stripping and grubbing operations off site at a suitable disposal site in accordance with applicable Federal, State Codes, ordinances, statutes and regulations.

E. Excavated Materials: Native soil complying with the requirements of may be used for backfill, fill and embankments where suitable for the given condition. Do not stock pile excess materials on site. Remove all excess soils from the site and dispose of legally.

F. Daily remove all debris such as spent air filters, oil cartridges, cans, bottles, combustibles and litter. Take care to prevent dust, trash, and papers from blowing in wind. Collect immediately.

G. Washing of cementitious mixing vessels, paint supplies, or other containers where waste water may reach storm drains, natural water courses, or existing or proposed landscape areas shall not be permitted. Refer to Section 01 35 00 Environmental Protection.

1.8 CONSTRUCTION WASTE & RECYCLING SIGNAGE

A. Develop and install temporary signage related to the Waste Management and Recycling Plan.

B. Provide graphic design for all signage and comply with Section 01 58 00 – Temporary Project Signage.

C. Provide not less than one general sign that includes summarized requirements of the Waste Management and Recycling Plan, as well as multiple individual signs of adequate size and clarity such that each collection bin and temporary storage area for such materials is readily identifiable to all personnel. Signage shall be specific in terms of what materials are acceptable or unacceptable for the designated bin or location.

D. Maintain signage in a suitable condition and replace signage as bins are delivered and removed from the Construction Site.

1.9 WORKER TRAINING PROGRAM

E. Train all personnel on the job specific conditions and general elements of the Waste Management and Recycling Plan. Employee training program to be developed and completed by the Contractor prior to starting work and for all new employees and subcontractors as they first enter the Construction Area.
   a. Distribute copy of the Waste Management and Recycling Plan and review procedures and locations established for the collection of materials.
   b. It is essential that all personnel follow all sorting requirements as the course of construction progresses, rather than attempting to sort materials after already heaped in mixed piles or bins.

1.10 CONSTRUCTION WASTE RECORDS

A. Track and record the weight of all materials using an approved scale.
B. Maintain copies of all related receipts for all materials disposed of by landfill or transfer station.
C. Maintain copies of all related receipts for all materials recycled, or otherwise salvaged.
D. Enter each receipt in the approved waste record form in a timely manner throughout the course of construction.
E. Review the Construction Waste Records at each Construction Progress Meeting and prior to each Application for Payment.
F. Not including excavated soils or land clearing debris, the total weight of all materials recycled and salvaged shall be equal to or greater than 75% of the total of all recycled, salvaged, and landfilled materials combined.
G. Demonstrate final compliance by submitting Submit final Construction Waste Records prior to Project Completion.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

A. Implement the Waste Management and Recycling Plan and Construction Waste Records requirements as specified above.

B. Notify University of any discrepancy or issue which may require specific attention.

C. Contractor's failure to comply with the requirements of this section shall be considered a loss to the University and shall be compensated appropriately.

END OF SECTION

SECTION 01 75 00: STARTING AND ADJUSTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Starting, testing, adjusting, and balancing systems.

1.3 RELATED SECTIONS

A. Section 01 31 00 - Project Coordination: For required coordination for system completeness.

B. Section 01 31 20 – Project Meetings: For general requirements for project meetings and for pre-installation conferences.

C. Section 01 45 00 - Quality Control: Manufacturers field reports.

D. Section 01 78 30 - Operation and Maintenance Manuals: System operation and maintenance data and extra materials.

E. Section 01 82 00 – Demonstration and Training: For training University staff on start-up procedures.

F. Other sections including those related to commissioning requirements.

1.4 STARTING SYSTEMS

A. Coordinate schedule for start-up of various equipment and systems. Verify environmental conditions including degree of enclosure, temperature, humidity, and other factors are within the appropriate ranges for the system. Ensure the environment is clean and free of dust or other contaminants. Remove plastic covers or other protective elements only after all conditions are satisfactory.

B. Notify University and Commissioning agent, as applicable, in writing at least seven calendar days prior to start-up of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.

D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify that wiring and support components for equipment are complete and tested.

F. Execute start-up under supervision of applicable manufacturer's representative and/or Contractor's personnel in accordance with manufacturer's instructions.

G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.

H. Submit a written Report in accordance with Section 01 33 00 - Submittals Procedures that equipment or system has been properly installed and is functioning correctly.

1.5 TESTING, ADJUSTING, AND BALANCING

A. Testing Agency: Appoint, employ, and pay for services of an independent firm to perform testing, adjusting and balancing.

B. Reports will be submitted by the independent firm to University indicating observations and results of tests and indicating compliance with the requirements of the Contract Documents.

C. University reserves the right to hire its own independent testing and balancing company to check the work and the report submitted by the Contractor's testing and balancing firm.

D. Implement the required Demonstration and Training of University staff in accordance with Section 01 82 00.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 01 77 00: CONTRACT CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Contract closeout procedures, including Contract Closeout meetings, correction ("punch") lists, submittals and final payment procedures.

1.3 RELATED SECTIONS

A. Section 01 33 00 - Submittals Procedures: General requirements for submittals.

B. Section 01 74 00 - Cleaning Requirements: Final cleaning as part of Contract closeout.

C. Section 01 78 50 - Warranties and Bonds: To be submitted as part of Contract closeout.

D. Section 01 78 90 – Project Record Documents: Project record drawings and specifications to be submitted as part of Contract closeout.

E. All other Sections as applicable.

1.4 SUBMITTALS

A. Punch List
B. Final Completion Submittals:
    1. Agency Document Submittals;
    2. Final Specifications Submittals;
    3. Certificates of Compliance and Test Report Submittals;
    4. Subcontractors List;
    5. Warranty Documents.
C. Final Application for Payment.

1.5 FINAL COMPLETION ACTIONS

A. Contractor Responsibility: Contractor shall be solely responsible for the timely completion of all required Contract closeout items except for filing of Notice of Completion by the University.

B. Warranties, Bonds and Certificates: Contractor shall submit specific warranties, guarantees, workmanship bonds, maintenance agreements, final certifications and similar documents.

C. Locks and Keys: Contractor shall change temporary lock cylinders over to permanent keying and transmit keys to University, unless otherwise directed or specified.

D. Tests and Instructions: Contractor shall complete start-up testing of systems, operations and maintenance manuals, and instruction of the University's personnel. Contractor shall remove

temporary facilities from the site, along with construction tools, mock-ups, and similar elements. All such elements and other similar requirements are included in more detail in other Sections.

1.6 CONTRACT COMPLETION REVIEW

A. Contractor's Notification for Contract Completion Preliminary Review Meeting: When the Contractor determines that the Work is nearly complete in accordance with Contract Documents, the Contractor shall submit to University written certification that the Contract Documents have been reviewed, the Work has been inspected by the Contractor and by authorities having jurisdiction, and the facility is ready for the Contract Completion review.

B. Contract Completion Preliminary Review Meeting: University's Representative and, as authorized by the University, Architect and Architect's and University' representatives and consultants, as appropriate, will attend a meeting at the Project site to review Contract closeout procedures and to review the items to be completed and corrected Punch List to make the Work ready for acceptance by the University. This meeting shall be scheduled four weeks prior to scheduled completion date.

C. Punch List Submittal: Contractor shall prepare, subsequent to the Contract Completion Preliminary Review Meeting, a typewritten, comprehensive list of items to be completed and corrected (Punch List) to make the Work ready for acceptance by the University. It is understood that a punch list is in the constant state of change, but this is an official snapshot in time for this formal Punch List Submittal.
   1. The Punch List shall include all items to be completed or corrected prior to the Contractor's application for final payment. The University or inspector(s) may add items to the Contractor's Punch List, but it is the Contractor's responsibility to maintain the full and complete list including items known to be deficient even if not specifically noted by the University.
   2. The Punch List shall identify items in a sequential order and include the room number and name in addition to a description of the issue.
   3. All separate lists shall be compiled by the Contractor into the all-inclusive master Punch List.
   4. Items to be considered shall include but not be limited to the following (as applicable):
      a. Corrections to construction.
      b. Operation and maintenance data (manuals).
      c. HVAC testing and balancing reports.
      d. Spare parts and extra materials.
      e. Keys, permanent keying and lock cylinders.
      f. Warranties and guaranties.
      g. Project record Drawings and Specifications.
      h. Project record construction schedule.
      i. State Fire Marshal Inspection.
      j. Elevator Inspection.
      k. Other regulatory inspections.
      l. Removal of construction facilities and temporary controls.
      m. Final cleaning and pest control.
      n. Landscape maintenance.
      o. Commissioning/equipment startup.
      p. Demonstration and training.
      q. Acceptance.
      r. Notice of Completion, filing by University.
      s. Final application for payment.
      t. Occupancy by University.
      u. Other closeout items specified.

D. Contract Completion Meeting: On a date mutually agreed by University and Contractor, a meeting shall be conducted at the Project site to determine whether the Work is satisfactory and has achieved Contract Completion.
   1. Contractor shall provide a minimum seven calendar days written notice to the University's Representative for requested date of Contract Completion meeting. Show on the Construction Progress Schedule.
   2. Architect and the Architect's consultants may attend the Contract Completion meeting.
   3. In addition to conducting a walk-through of the facility and reviewing the Punch List, the purpose of the meeting shall include submission of warranties, guarantees and bonds to University, submission of final operation and maintenance manuals, provision of specified extra materials to University, and submission of other Contract closeout documents and materials as required and if not already submitted.
   4. Architect and Architect's consultants, as appropriate, may conduct a walk-through of the facility with the University's Representative and Contractor to review the completion of the Punch List.
   5. Architect and University may update the Punch List and record additional items as may identified during the walk-through, including notations of corrective actions to be taken.
   6. Contractor shall update the Punch List and submit it within five calendar days to the University.

E. Uncorrected Work: Refer to requirements specified in Section 01 45 00 - Quality Control regarding Contract adjustments for non-conforming Work.

F. Clearing and Cleaning: Prior to the Contract Completion review, Contractor shall conduct a thorough cleaning and clearing of the Project area, including removal of construction facilities and temporary controls. Refer to Section 01 74 00 - Cleaning Requirements.

G. Inspection and Testing: Prior to the Contract Completion review, Contractor shall complete inspection and testing required for the Work, including securing of approvals by authorities having jurisdiction.
   1. Complete all inspections, tests, balancing, sterilization and cleaning of plumbing and HVAC systems, electrical power and signal systems, and conveying (elevator) systems.

H. Notice of Completion: University will record the Notice of Completion with County Recorder, when the Project is complete in all respects.

1.7 FINAL COMPLETION SUBMITTALS

A. Final Completion Submittals: Prior to application for Final Payment, Contractor shall submit the following:

B. Agency Document Submittals: Contractor shall submit to University all documents required by authorities having jurisdiction, including serving utilities and other agencies. Contractor shall submit original versions of all permit cards, with final sign-off by inspectors. Submit all certifications of inspections and tests.

C. Final Specifications Submittals: Contractor shall submit to University all documents and products required by Specifications to be submitted, including the following:
   1. Project record drawings and specifications.
   2. Operating and maintenance data.
   3. Guarantees, warranties and bonds.
   4. Keys and keying schedule.
   5. Spare parts and extra stock.

6. Test reports and certificates of compliance.

D. Certificates of Compliance and Test Report Submittals: Contractor shall submit to University's Representative certificates and reports as specified and as required by authorities having jurisdiction, including but not limited to the following, as applicable:
   1. Sterilization of water systems.
   2. Sanitary sewer system tests.
   3. Gas system tests.
   4. Lighting, power and signal system tests.
   5. Ventilation equipment and air balance tests.
   6. Fire sprinkler system tests.
   7. Roofing inspections and tests.

E. Subcontractors List: Contractor shall submit final Subcontractor and Materials Supplier List.

F. Warranty Documents: Contractor shall prepare and submit to University all warranties and bonds as specified in Section 01 78 50 - Product Warranties and Bonds.

1.8 FINAL PAYMENT

A. Final Payment: After completion of all items listed for completion and correction and after submission of all documents and products and after final cleaning, Contractor shall submit final Application for Payment, identifying total adjusted Contract Sum, previous payments and sum remaining due. Payment will not be made until the following are accomplished, as well as all other conditions of the Contract:
   1. All Project Record Documents have been received and accepted by the University.
   2. All extra materials and stock items have been transferred to and accepted by University.
   3. All warranty documents and operation, maintenance data, service agreements, maintenance contracts and salvage materials have been received and accepted by University.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 78 30: OPERATION AND MAINTENANCE MANUALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Format and content, and submission requirements for operation and maintenance manuals.

1.3 RELATED SECTIONS

A. Section 01 45 00 - Quality Control: Manufacturer's instructions; test and balance reports.
B. Section 01 77 00 - Contract Closeout Procedures: Contract closeout procedures.
C. Section 01 78 50 - Product Warranties and Bonds: Requirements for warranties and bonds.
D. Section 01 78 90 - Project Record Documents: Submission of Project record documents.
E. Section 01 82 00 – Demonstration and Training: Coordinate manuals for training sessions.

1.4 QUALITY ASSURANCE

A. Ensure that data is arcuate and in conformance with the manufacturer’s recommendations and applicable regulations for the types of products, systems, and equipment.

1.5 SUBMITTALS

A. Operation and Maintenance Manuals: Contractor shall develop and submit Operation and Maintenance Manuals for all products, assembly of products, materials, systems, and equipment used in the Project.

A. Submittal Due: Schedule submission of Manuals to allow sufficient time for receipt, review and acceptance of instruction program by the Architect and University plus a minimum of two additional weeks prior to proposed date of first Demonstration and Training session. Show the proposed submittal dates in the Submittals Schedule, and coordinate with the Construction Schedule.

B. Submittal shall follow the general requirements in accordance with Section 01 33 00 Submittal Procedures as well as the specific requirements included in this Section.

1.6 FORMAT AND CONTENT OF OPERATION AND MAINTENANCE MANUALS

A. Format for Operation and Maintenance Manual Submittal: Organize operation and maintenance data as PDFs with file names to match the Section number and title for digital submission. Include the Table of Contents file and transmittal sheet. Also submit two matching hard-copies of the Operation and Maintenance Manuals submittal in three-ring binders and organize the contents of each binder following the organization of the Contract Specifications.

B. Operation and Maintenance Manual Organization:
   1. Organize the PDF files and contents of individual binders in sequence according to the Section numbers and titles as listed in the Table of Contents of this Project Manual. Number the binders consecutively; coordinate with Paragraph below titled "Tables of Contents."
   2. Organize each distinct product and system shall be in a single PDF with the file name

matching the relevant Section number and name identifying the product or system. In the printed manuals, each of these sections shall be separated in the three-ring binders by dividers with typed inserts or sticker labels on tabs identifying the product or system.

3. If the products of more than one Specification Section are included in the binder, provide separate, heavy cover stock dividers to separate information for each Section.

C. Binders: Use 8-1/2 x 11 inch, standard three-ring binders with heavy duty vinyl covers with hard cardboard backing, black color, with provision on binder spine for inserting identification card; Maximum binder ring size shall be three inches. Use multiple binders as necessary to avoid overfilling. When multiple binders are used, correlate data into related consistent groupings.

D. Cover: Contractor shall identify each binder with printed card inserted on binder spine, stating OPERATION AND MAINTENANCE MANUAL, the Project name and the general subject matter of the contents of the binder.

E. Title Page: In each binder include a title page with the following:
   1. Name of the Project.
   2. Names, addresses and telephone numbers of the Architect and Engineers of record
   3. Name, address and telephone numbers of Contractor, including names of contact persons.

F. Table of Contents: In each binder include a listing of the contents of the volume. In a separate, first binder, Contractor shall provide a master Table of Contents of operation and maintenance data, identifying the product and systems, the applicable Specification Section number and title, and the operation and maintenance data binder number.

G. Schedule of Products and Systems: In the first volume of the set of operation and maintenance data, include a schedule of products and systems, indexed to the Table of Contents of the binder and cross-referenced to the Contract Drawings and Specifications.

H. Operation and Maintenance Data: In each tabbed division of operation and maintenance data for each product or system, provide the following:

   1. On a cover page for each tabbed division, provide the following:
      a. Identify by name, address and telephone number, the manufacturer, supplier and installer. Include names of contact persons, if known.
      b. Identify by name, address and telephone number, local sources of supplies, replacement parts and factory-authorized service.
   2. Within each tabbed division, include complete operation and maintenance data as published by the product manufacturer where feasible. Otherwise, present all data neatly typewritten on 20 pound, correspondence quality bond paper. Contractor shall strike-through information on printed literature where not applicable and circle information that is applicable and critical.
   3. Contractor shall supplement the manufacturer's printed data with neatly typewritten text and professionally drafted diagrams as necessary to suit the particular installation for the Project and to fully explain operation and maintenance procedures.

I. Drawings: Contractor shall supplement operation and maintenance data to illustrate configurations and relationships of component parts of equipment and systems, and to show control and flow diagrams, as applicable to the actual installation conditions for this particular Project.

J. Warranty and Guaranty: Include copy of each warranty, and any guaranty, bond and service contract issued. Provide information sheet identifying:
   1. Proper procedures in event of failure.

2. Instances that might affect validity of warranties or bonds.

K. Material Safety Data Sheet (MSDS): For products requiring MSDS, according to CCR Title 8 and the University policy, Contractor shall include copy of each applicable Material Safety Data Sheet (MSDS) for products delivered to the site and incorporated into the completed construction.

1.7 MANUAL REQUIREMENTS FOR MATERIALS AND FINISHES

A. Manual requirements for Building Products, Applied Materials and Finishes: Include product data, with catalog number, size, composition, and color and texture designations.

B. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

C. Data for Moisture Protection and Weather-Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional Requirements: As specified in individual product Specification Sections.

1.8 MANUAL REQUIREMENTS FOR EQUIPMENT AND OPERATING SYSTEMS

A. Manual requirements for Equipment and Operating Systems:
1. Include manufacturer's printed operation and maintenance instructions.
2. Identify function, normal operating characteristics and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Include sequence of operation by controls manufacturer, as applicable.
5. Provide diagrams by controls manufacturer for control systems, as applicable and as installed.

B. Piping Data: Provide Contractor's coordination drawings, with piping diagrams as installed. Contractor shall provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams. Color code diagrams as necessary for clarity.

C. Reports: Include test and balancing reports per individual product Specification Sections.

D. Panelboard Circuit Directories: Electrical service characteristics, controls and communications.

E. Wiring Diagrams: Include diagrams of wiring as installed, with color coding as necessary for clarity.

F. Operating Procedures:
1. Start-up, break-in, and routine normal operating instructions and sequences.
2. Regulation, control, stopping, shut-down, and emergency instructions.
3. Summer and winter operating instructions.
4. Special operating instructions.

G. Maintenance Requirements:
1. Routine maintenance procedures and guide for trouble-shooting.
2. Disassembly, repair, and reassembly instructions.
3. Alignment, adjusting, balancing, and checking instructions.

H. Servicing and Lubrication: Provide servicing and lubrication schedule, and list of lubricant

products.

I. Parts Data: Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams as necessary for service and maintenance.
   1. Include complete nomenclature and catalog numbers for consumable and replacement parts.
   2. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in stock by the University.

J. Software: Provide all programming codes, access codes and other data necessary for operation, maintenance, future functioning and modifications of microprocessor-controlled products, independent of Original Equipment Manufacturer (OEM).

K. Additional Requirements: As specified in individual product Specification Sections.

1.9 MANUAL REQUIREMENTS FOR ELECTRIC AND ELECTRONIC SYSTEMS

A. Manual requirements for Electrical and Electronic Systems: Provide description of each system and component parts, including:
   1. Function, normal operating characteristics and limiting conditions.
   2. Performance curves, engineering data and tests.
   3. Complete nomenclature and commercial number of replaceable parts.

B. Circuit Directories of Panel Boards: Electrical service, Controls, and Communications.

C. Wiring Diagrams: As-installed, color-coded wiring diagrams.

D. Operating procedures:
   1. Routine and normal operating instructions.
   2. Sequences required.
   3. Special operating instructions.

E. Maintenance procedures:
   1. Routine operations.
   2. Guide to "trouble-shooting."
   3. Disassembly, repair and reassembly.
   4. Adjustment and checking.

F. Provide Manufacturer's printed operating and maintenance instructions.

G. Provide list of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.

H. Contractor shall prepare and include additional data when the need for such data becomes apparent during instruction of Owner's personnel.

I. Additional requirements for operating and maintenance data: Respective sections of specifications.

1.10 INSTRUCTION OF UNIVERSITY'S PERSONNEL

A. Coordinate with requirements specified in Section 01 82 00 - Demonstration and Training.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 78 50: WARRANTIES AND BONDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. General administrative and procedural requirements for preparation and submission of warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special Project warranties.
   1. Refer to the Contract General Conditions for terms of Contractor's special warranty of workmanship and materials.
   2. Certifications and other commitments and agreements for continuing services to University are specified elsewhere in the Contract Documents.

1.3 RELATED DOCUMENTS AND SECTIONS

A. Section 01 33 00 - Submittals Procedures: General administrative requirements for submittals, applicable to warranties and bonds.

B. Section 01 77 00 - Contract Closeout Procedures: General requirements for closeout of the Contract.

C. Section 01 78 30 - Operation and Maintenance Data: Operating and maintenance data binders, to include copies of warranties and bonds.

D. Special Project warranty requirements for specific products or elements of the Work; commitments and agreements for continuing services to University.

1.4 DEFINITIONS

A. Warranty: Assurance to University by Contractor, installer, supplier, manufacturer or other party responsible as warrantor, for the quantity, quality, performance and other representations of a product, system service of the Work, in whole or in part, for the duration of the specified period of time. The University’s standard warranty form shall be used for all warranties under this Contract unless otherwise agreed to in writing by the University Representative.

B. Guaranty: Assurance to University by Contractor or product manufacturer or other specified party, as guarantor, that the specified warranty will be fulfilled by the guarantor in the event of default by the warrantor.

C. Standard Product Warranty: Preprinted, written warranty published by product manufacturer for particular products and specifically endorsed by the manufacturer to the University.

D. Special Project Warranty: Written warranty required by or incorporated into Contract Documents, to extend time limits provided by standard warranty or to provide greater rights for University.

E. Guaranty Period: As defined in the Contract General Conditions, guaranty period shall be synonymous with "warranty period", "correction period" and similar terms used in the Contract Specifications. Warranty period shall be one year from the date of Project Completion unless otherwise agreed to in writing by the University Representative.

1.5 WARRANTIES AND GUARANTIES

A. Warranties and Guaranties, General: Contractor shall provide all warranties and guaranties with University named as beneficiary. For equipment and products, or components thereof, bearing a manufacturer's warranty or guaranty that extends for a period of time beyond the Contractor's warranty and guaranty, Contractor shall so state in the warranty or guaranty. See Contract General Conditions article 8.06 for additional requirements.

B. Provisions for Special Warranties: Refer to Contract General Conditions for terms of the Contractor's special warranty of workmanship and materials.

C. General Warranty and Guaranty Requirements: Warranty shall be an agreement to repair or replace, without cost and undue hardship to University, Work performed under the Contract which is found to be defective during the guaranty period (warranty or guaranty) period. Repairs and replacements due to improper maintenance or operation, or due to normal wear, usage and weathering are excluded from warranty requirements unless otherwise specified.

D. Specific Warranty and Guaranty Requirements: Specific requirements are included in product Specifications Sections of all Divisions including content and limitations.

E. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties and guaranties shall not relieve Contractor of responsibility for warranty and guaranty requirements for the Work that incorporates such products, nor shall they relieve suppliers, manufacturers, and installers required to countersign special warranties with Contractor.

F. Related Damages and Losses: When correcting warranted Work that has been found defective, Contractor shall remove and replace other Work that has been damaged as a result of such defect or that must be removed and replaced to provide access for correction of warranted Work.

G. Reinstatement of Warranty: When Work covered by a warranty has been found defective and has been corrected by replacement or rebuilding, Contractor shall reinstate the warranty by written endorsement.

H. Replacement Cost: Upon determination that Work covered by a warranty has been found to be defective, Contractor shall replace or reconstruct the Work to a condition acceptable to University's Representative, complying with applicable requirements of the Contract Documents. Contractor shall be responsible for all costs for replacing or reconstructing defective Work regardless of whether University has benefited from use of the Work through a portion of its anticipated useful service life.

I. University's Recourse: Written warranties made to University shall be in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under law, nor shall warranty periods be interpreted as limitations on time in which University can enforce such other duties, obligations, rights, or remedies.

    1. Rejection of Warranties: University reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract

Documents.

J. Warranty as Condition of Acceptance: University reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment shall be required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

1.6 PREPARATION OF WARRANTY AND BOND SUBMITTALS

A. Project Warranty and Guaranty Forms: Forms for Project warranties and guaranties may included in the Contract Documents, or will be provided directly by the University. Contractor shall submit the warranty package submittal to the University, with a copy to the University Representative, for review and approval. Contractor shall:
   1. Refer to product Specifications Sections of all Divisions for specific content requirements, and particular requirements for submittal of special warranties.
   2. Prepare standard warranties and guaranties, excepting manufacturers' standard printed warranties and guaranties, on Contractor's, subcontractor's, material supplier's, or manufacturer's own letterhead, addressed to University.
   3. Warranty and guaranty letters shall be signed by all responsible parties and by Contractor in every case, with modifications only as approved in advance by University's Representative to suit the conditions pertaining to the warranty or guaranty.

B. Manufacturer's Guaranty Form: Manufacturer's guaranty form may be used instead of special Project form included in the Contract Documents, if agreed to in writing by the University's Representative. Manufacturer's guaranty form shall contain appropriate terms and identification, ready for execution by the required parties.

   1. If proposed terms and conditions restrict guaranty coverage or require actions by University beyond those specified, Contractor shall submit draft of guaranty to the University and the University's Representative for review and approval before performance of the Work.

   2. In other cases, Contractor shall submit draft of guaranty to the University for approval prior to final execution of guaranty.

C. Signatures: Signatures shall be by person authorized to sign warranties, guaranties and bonds on behalf of entity providing such warranty, guaranty or bond.

D. Co-Signature: All installer's warranties and bonds shall be co-signed by Contractor. Manufacturer's guaranties will not require co-signature.

1.7 FORM OF WARRANTY AND BOND SUBMITTALS

A. Form of Warranty and Bond Submittals: Prior to completion, Contractor shall collect and assemble all written warranties and guaranties into electronic PDF files and one printed original hard-copy binder set and submit to the University for review and acceptance.
   1. Prior to submission, verify documents are in proper form, contain all required information, and are properly signed by Contractor, subcontractor, supplier and manufacturer, as applicable.
   2. Organize warranty and guaranty documents into an orderly sequence based on the Table of Contents of the Project Manual.
   3. Include Table of Contents for both electronic PDF and printed binder copy, neatly typed, following order and section numbers and titles as used in the Project Manual.
   4. Bind warranties, guaranties and bonds in heavy-duty, commercial quality, durable three-ring

vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, with clear front and spine to receive inserts, and sized to receive 8-1/2 inch by 11-inch paper.

5. Provide heavy paper dividers with celluloid or plastic covered tabs for each separate warranty. Mark tabs to identify products or installation, and section number and title.
6. Include on separate typed sheet, if information is not contained in warranty or guaranty form, a description of the product or installation, and the name, address, telephone number and responsible person for applicable installer, supplier and manufacturer.
7. Identify each binder on front and spine with typed or printed inserts with title "WARRANTIES AND BONDS", the Project title or name, and the name of the Contractor. If more than one volume of warranties, guaranties and bonds is produced, identify volume number on binder.
8. When operating and maintenance data manuals are required for warranted construction, include additional copies of each required warranty and guaranty in each required manual. Coordinate with requirements in Section 01 78 30 - Operation and Maintenance Manuals.

1.8 TIME OF WARRANTY AND BOND SUBMITTALS

A. Submission of Preliminary Copies: Unless otherwise specified, Contractor shall obtain preliminary copies of warranties, guaranties and bonds within ten days of completion of applicable Work.

B. Submission of Final Copies: Contractor shall submit fully executed copies of warranties, guaranties and bonds prior to Notice of Completion.

C. Date of Warranties and Bonds: Unless otherwise directed or specified, commencement date of warranty, guaranty and bond periods shall be the date established in the Notice of Completion.
   1. Warranties for Work accepted in advance of date stated in Notice of Completion: When a designated system, equipment, component parts or other portion of the Work is completed and occupied or put to beneficial use by University's Representative, by separate written agreement with Contractor, prior to completion date established in the Notice of Completion, Contractor shall submit properly executed warranties to University, as directed by University's Representative, within ten days of completion of that designated portion of the Work. Contractor shall list date of commencement of warranty, guaranty or bond period as the date established in the Notice of Completion.

D. Duration of Warranties and Guaranties: Unless otherwise specified or prescribed by law, warranty and guaranty periods shall be not less than the guaranty period required by the Contract General Conditions, but in no case less than one year from the date established for completion of the Project in the Notice of Completion. See product Specifications Sections in all Divisions of the Project Manual for extended warranty and guaranty beyond the minimum one-year duration.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 78 90: PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Requirements for Project Record Documents to be submitted for Contract closeout.

1.3 RELATED SECTIONS

A. Section 01 33 00 - Submittals Procedures: General requirements for submission for shop drawings, product data, samples and quality control reports.

1.4 SUBMITTALS

A. Project Record Documents: Submit hard-copy and electronically scanned PDF complete set of all Project Record Documents including: Record Drawings, Record Specifications, Record Product Data, and other record documents.
   1. Due:
      a. Review drafts in-progress at each Construction Progress Meeting.
      b. Submit final Record Documents prior to Project Completion.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain and protect Record Documents from deterioration and loss in a secure, fire-resistive location; provide access for University and the Architect's reference during normal working hours. Store Record Documents separately from documents used for construction.

B. Record Drawings: Contractor shall record information continuously as Work progresses. In addition to the requirements for inspections and approvals, Contractor shall not conceal Work until all required information is recorded.
   1. Maintain a clean, undamaged set of Contract Drawings, Shop Drawings, and Coordination Drawings. Mark the set to show the actual installation (aka “as-built”) where the installation varies from the Work as originally shown. Mark whichever drawing is most capable of showing conditions fully and accurately, and mark other drawings to provide complete record. This record may be maintained either in hard-copy format using erasable **red-colored** pencil, or in electronic format as PDF file **red-colored** mark-ups using Adobe Acrobat Pro. If maintained in hard-copy, it will be required to be scanned for final submittal.
   2. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.
   3. Mark new information that is important to the University, but was not shown on Contract Drawings or Shop Drawings. Record actual construction, including:
      a. Measured depths of foundations and footings encountered or constructed, measured in relation to finish First Floor datum or approved survey benchmark.

b. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent ground improvements.
c. Field changes of dimension and detail.
d. Details not on original Contract Drawings. Application of copies of details produced and provided by Architect during construction will be accepted.
e. Permanent Room names and Room numbers where different than the original drawings.

4. Note/tag Change Order & RFI numbers where related to the applicable areas of the drawings.
5. Organize record drawing sheets into manageable sets, bind with durable paper cover sheets, and print suitable titles, dates and other identification on the cover of each set.
6. Verify Record Drawings are being adequately maintained throughout the course of construction. Note this is an agenda item for each Construction Progress Meeting per Section 01 31 20 Project Meetings.

C. Record Specifications: Contractor shall record changes made by Addenda, Change Orders, as well as responses to Submittals, Substitution Requests, and RFI's as applicable to each Specification Section contained in this Project Manual. This record may be maintained either in hard-copy format using erasable **red-colored** pencil, or in electronic format as PDF file **red-colored** mark-ups using Adobe Acrobat Pro. If maintained in hard-copy, it will be required to be scanned for final submittal.
1. Manufacturer's name and product model or catalog number.
2. Product substitutions or alternates utilized.
3. Verify Record Specifications are being adequately maintained throughout the course of construction. Note this is an agenda item for each Construction Progress Meeting per Section 01 31 20 Project Meetings.

D. Record Product Data: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in the approved Product Data submittal. This record may be maintained either in hard-copy format using erasable **red-colored** pencil, or in electronic format as PDF file **red-colored** mark-ups using Adobe Acrobat Pro. If maintained in hard-copy, it will be required to be scanned for final submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation
3. Verify Record Product Data are being adequately maintained throughout the course of construction. Note this is an agenda item for each Construction Progress Meeting per Section 01 31 20 Project Meetings.

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 82 00: DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SECTION INCLUDES

A. Administrative and procedural requirements for instructing University's personnel, including demonstration and training of operation and maintenance of all systems, subsystems and equipment installed under the Contract.

1.3 RELATED SECTIONS

A. Section 01 78 30 - Operation and Maintenance Manuals: Operating and maintenance instructions to be used during training and demonstration.

1.4 SUBMITTALS

A. Demonstration and Training Program:
   1. Contractor shall develop and submit Demonstration and Training Program, beginning with a summarized schedule of proposed dates, times, length of instruction time, and instructor's names for each training module. Follow with an outline format of the instructional program, including learning objectives and content described below.
   2. Submittal Due: Schedule submission of Program to allow sufficient time for receipt, review and acceptance of instruction program by the Architect and University plus a minimum of two additional weeks prior to proposed date of first training session. Show the proposed submittal dates in the Submittals Schedule, and coordinate with the Construction Schedule. The Demonstration and Training modules are encouraged to be scheduled as early as practical after the related Work is tested, adjusted, complete, and fully operational in order to not cause delay in the progress of the Work or the closeout of the Project.
   3. Demonstration and Training Program submittal shall follow the general requirements in accordance with Section 01 33 00 Submittal Procedures.

B. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Contractor shall include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information.

C. Attendance Record: For each training module, submit list of participants and length of instruction.

D. Demonstration and Training Video Record: Submit electronic file of video of each training session.

1.5 QUALITY ASSURANCE

A. Instructor Qualifications: Contractor shall engage qualified instructors to instruct University's personnel how to adjust, operate, and maintain systems, subsystems, and equipment. Instructors

shall be authorized service representatives, complying with Section 01 45 00 - Quality Control.

B. Pre-Instruction Conferences: During pre-installation conferences as specified in Section 01 31 00 – Project Coordination, review methods and procedures related to demonstration and training.

1.6 COORDINATION

A. Coordination of Instruction Schedule: Coordinate instruction schedule with University's operations. Contractor shall adjust schedule as required to minimize disrupting University's operations.

B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manual in accordance with Section 01 78 30 - Operation and Maintenance Manuals.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Contractor shall develop an instruction program that includes individual training sessions for each system and operating products as part of the Project. Include instruction on operational interfaces between systems.

B. Schedule of Training Sessions: Contractor shall arrange to have training conducted with no more than four hours of training scheduled for any one day. Concurrent classes will not be acceptable.

C. Training Sessions, General: Contractor shall develop a learning objective and teaching outline for each session. Contractor shall include a description of specific skills and knowledge that participant is expected to master. Training sessions shall progress logically. Each training session shall be comprised of time spent both in a classroom type environment and at specific location of subject equipment or system as appropriate. As a minimum, Contractor shall ensure that each training session covers the following subjects for each item of equipment and system:

1. Familiarization:
   a. Review catalog, parts lists, drawings, etc., which have been previously provided for the plant files and operation and maintenance manuals.
   b. Check out the installation of the specific equipment items.
   c. Demonstrate the unit and indicate how all parts of the specifications are met.

2. Safety:
   a. Using material previously provided, review safety references.
   b. Discuss proper precautions around equipment.

3. Operation:
   a. Using material previously provided, review reference literature.
   b. Explain all modes of operation (including emergency).
   c. Check out University's personnel on proper use of the equipment.

4. Preventive Maintenance:
   a. Using material previously provided, review preventive maintenance (PM) lists including:
      1) Reference material.
      2) Daily, weekly, monthly, quarterly, semiannual, and annual jobs.
   b. Demonstrate how to perform Preventive Maintenance tasks.

c. Demonstrate to University's personnel what to look for as indicators of deficiencies.

5. Corrective Maintenance:
   a. List possible problems and discuss repairs.
   b. Open up equipment and demonstrate procedures, where practical.

6. Parts:
   a. Show how to use previously provided parts list and order parts.
   b. Check over spare parts and recommendations for additional parts that should be stocked.

7. Local Representatives:
   a. Where to order parts: Name, address, and telephone of at least one source.
   b. Service problems:
      1) At least one service provider for service, including name, address, and telephone.
      2) Who to contact for emergency service, where different than general service issues.

8. Operation and Maintenance Manuals:
   a. Review any other material submitted.
   b. Update material, as required.

D. Classroom Training for Operations Personnel:
1. Using projected drawings and photographs, describe and discuss equipment locations in plant and present operational overview of systems. Discuss operating and maintenance manuals.
2. Describe purpose and plant function of equipment and systems.
3. Describe operating theory of equipment.
4. Describe start-up, shutdown, normal operation and emergency operating procedures, including discussion of system integration and electrical interlocks, if any.
5. Identify and discuss safety items and procedures.
6. Describe routine preventive maintenance, including specific details on lubrication and maintenance of corrosion protection of the equipment and ancillary components.
7. Describe operator detection, without test instruments, of specific equipment trouble symptoms.
8. Describe required equipment performance test procedures and intervals.
9. Describe routine disassembly and assembly of equipment if applicable (as determined by University on case-by-case basis) for purposes such as operator inspection of equipment.

E. Classroom Training for Maintenance and Repair Personnel:
1. Theory of operation.
2. Description and function of equipment.
3. Start-up and shutdown procedures.
4. Normal and major repair procedures.
5. Equipment inspection and troubleshooting procedures including the use of applicable test instruments and the "pass" and "no pass" test instrument readings.
6. Routine and long-term calibration procedures.
7. Safety procedures.
8. Preventive maintenance such as lubrication; normal maintenance such as belt, seal, and bearing replacement; and up to major repairs such as replacement of major equipment part(s) with the use of special tools, bridge cranes, welding jigs, etc.

F. Field Training for Operations Personnel:
1. Identify locations of equipment components and controls.
2. Review of component functions and theory of operation.

3. Identifying piping and flow options.
4. Identifying valves and explain their functions at various settings.
5. Identifying instrumentation purpose, operation, and information interpretation.
6. Discuss, demonstrate, and perform standard operating procedures and round checks, including system start-up and shutdown procedures.
7. Review and perform safety procedures.
8. Perform the required equipment exercise procedures.
9. Discuss and perform preventive maintenance activities.
10. Identify and review safety items and perform safety procedures, if feasible.

G. Field Training for Maintenance and Repair Personnel: In addition to field training specified above for operations personnel, include the following:
1. Describe normal repair procedures.
2. Perform routine disassembly and assembly of equipment, for inspections and tests.
3. Perform routine maintenance and repair tasks, including mechanical and electrical operations for troubleshooting, adjustments and calibration.

H. Presentation Media:
1. Presentations shall utilize computer-generated, projected graphics utilizing Microsoft PowerPoint or similar software. Graphics shall include text and images.
2. Each session shall include mock-ups, samples and other visual aids as appropriate.
3. Each session shall include printed handouts and notes for each participant.
4. Submit electronic copy of all presentation media in their original native software format as well as in PDF file type for the project records.

I. Video Record: Each training session shall be recorded in a digital video/audio format.

PART 3 - EXECUTION

3.1 INSTRUCTION

A. Preparation:
1. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
2. Set up instructional equipment at instruction location.

B. Training Sessions: Conduct classroom and field training sessions presenting content specified in Article 2.1, titled "Instruction Program," above. Handing out the Operations and Maintenance manual and soliciting questions from the trainees does not constitute training.

D. Demonstration and Training Video: Contractor shall provide recording of training sessions. Digital video material shall be to provide a permanent record for use by University.
1. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
2. At the beginning of each video, record the printed title sheet summary of the training module, including the learning objective and lesson outline.

C. Cleanup:
1. Collect used and leftover educational materials and deliver to University as requested.
2. Remove instructional equipment.
3. Restore systems and equipment to regular operating condition.

END OF SECTION

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SECTION 06 10 00: ROUGH CARPENTRY

PART 1 GENERAL

1.01 DESCRIPTION

A. Section Includes:

1. Provision of all lumber framing, rough hardware and blocking as indicated in the contract drawings.

2. Requirements for FRTW (Fire Retardant Treated Wood).

1.02 REFERENCES

A. Requirements of GENERAL CONDITIONS and DIVISION NO. 1 apply to all Work in this Section.

B. The following published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to Work in this Section (latest editions apply).

1. California Code of Regulations. Title 24, 2019 edition, also known as California Building Code (CBC).
2. (APA) - American Plywood Association, “Guide to Plywood Grades.”
3. (PS) - United States Product Standard, PS-1 and PS-2 “Construction and Industrial Plywood.”
4. (UL) - Underwriters’ Laboratories, Inc., “Fire Hazard Classification, FR-S.”
5. (WCLIB) - West Coast Lumber Inspection Bureau, “Standard Grading Rules No. 17.”
6. (WWPA) - Western Wood Products Association, “Grading Rules for Lumber.”
7. (AWPA) - American Wood Preservers’ Association Standards.
   a. T1 – “Processing and Treatment Standard”
   b. U1 – “User Specification for Treated Wood”
8. (AF&PA) – American Forest and Paper Association, “National Design Specification for Wood Construction.” “Special Design Provisions for Wood & Seismic.”.
9. (ASTM) – American Society of Testing and Materials.

1.03 SUBMITTALS

A. Shop Drawings of all specially fabricated rough hardware.

B. Samples only as requested by the Architect.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Provide proper facilities for handling and storage of materials to prevent damage to edges, ends, and surfaces.

B. Keep materials dry. Where necessary, stack materials off ground on level flat forms, fully protected from weather.

1.05 JOB CONDITIONS

A. Environmental Requirements: Maintain uniform moisture content of lumber at not more than 19-percent during and after installation.

B. Sequencing, Scheduling: Coordinate details with other Work supporting, adjoining or fastening to rough carpentry Work.

PART 2 PRODUCTS

2.01 MATERIAL

A. Rough Carpentry:

1. Sills on Concrete: Foundation grade redwood or pressure treated Douglas Fir.
2. Lumber (Wood Framing): Meet requirements of following minimum grades.

Item	
Studs	D.F. No. 1
Plates	D.F. No. 1
Beams	D.F. No. 1
Joists	D.F. No. 1
Posts	D.F. No. 1
Blocking	D.F. No. 2

3. Plywood: Provide thickness, grade, and panel identification index shown on drawings. For plywood thickness 15/32 or greater provide minimum of 5 ply.

B. Rough Hardware: All exterior hardware shall be hot-dipped galvanized.

1. Nails: Common wire per ASTM F1667, typical; hot-dipped zinc-coated galvanized, stainless steel, silicon bronze, or copper at exposed conditions, fire-retardant-treated, and pressure-treated lumber.
2. Powder Driven Fasteners: Tempered steel pins with special corrosion-resistant finish. Provide guide washers to accurately control penetration. Accomplish fastening by low-velocity piston-driven powder-actuated tool. Pins and tool: Hilti Fastening Systems X-U or approved equal.
3. Expansion Bolts: Reverse cone, self-wedging, expansion type, Tightening of nut or increased tension on bolt shank shall act to force wedges outward to create positive increased resistance to withdrawal, Simpson Strong-Bolt, Hilti Kwik - Bolt TZ, or approved equal.
4. Metal Framing Connectors: Fabricate from hot-dipped galvanized steel (G90 coating). Connectors in contact with pressure treated lumber shall have G185 hot dipped galvanized coating per ASTM A653. Connectors in contact with fire treated lumber or are in high corrosive environments shall be manufactured with Type 316L stainless steel. Connectors shall be at least 16-gauge material, 1/8-inch plate materials where welded, unless otherwise shown or specified, punched for nailing. Nails and nailing shall conform to the manufacturer’s instructions, including coating and material where applicable, with a nail provided for each punched nail hole. Use maximum nail size listed by manufacturer. Manufactured by Simpson Company or approved equal.

5. Miscellaneous Hardware: Provide all common screws, bolts, fastenings, washers and nuts required to complete rough carpentry Work.
6. Bolts and sill bolts in wood shall be ASTM A307 with standard cut threads; full diameter bolts (no rolled or "upset" threads permitted) per ANSI/ASME standard B18.2.1.
7. Shear wall foundation anchor bolt washers shall conform to the requirements of CBC Section 2308.

2.02 TREATMENTS

A. Fire-Retardant Treatment for FRTW (Fire Retardant Treated Wood products): Furnish in accordance with AWPA Standards T1, U1, and P17, "Fire Retardant Formulations."

B. Preservative Treatment: Furnish in accordance with AWPA Standards T1 and U1. Preservatives with an ammonia base, including Ammoniacal Copper Zinc Arsenate (ACZA) are not permitted.

2.03 FABRICATION

A. Preparation:

1. Verify measurements at job site.
2. Verify details and dimensions of equipment and fixtures integral with finish carpentry for proper fit and accurate alignment.
3. Coordinate details with other work supporting, adjoining, or fastening to casework.

B. Lumber:

1. Air- or kiln-dry to maximum 19-percent moisture content at time of surfacing.
2. Furnish surfaced four sides, S4S, unless otherwise noted.
3. Size to conform with rules of governing standard. Sizes shown are nominal unless otherwise noted.

C. Wood Treatments:

1. Fire-Retardant Treatment:

a. Treat in accordance with AWPA Standards T1 and U1 and approved manufacturer's recommendations. Verify AWPA Use Category with proposed application prior to selected preservative. Fire treated lumber shall conform to the requirements of CBC Section 2303.2.
b. Fabrication of FRTW shall conform to code and manufacturer's requirements:
   i. To maintain the UL listing for FRTW, milling or ripping parallel-to-grain shall be done **prior to treatment**, as these actions post-treatment may alter the FRTW's surface burning characteristics.
   ii. Field cutting across the grain (cut-to-length) is permitted after treatment typically without treatment of cut ends (verify with specific manufacturer's requirements).
   iii. FRTW plywood may be cut or ripped in nay direction.
   iv. Drilling holes is allowed in both FRTW lumber and FRTW plywood.
c. It is the Contractor's responsibility to verify drawings and/or field dimensions that require FRTW components to be ripped or shaped to specific dimensions. This

will need to be done as soon as possible after Contractor site mobilization to allow sufficient lead time to have FRTW components ripped or shaped and then fire retardant treated **after ripping or shaping**. Additional time or expense will not be allowed to the contract for construction based upon not having sufficient lead time to procure FRTW components after ripping or shaping. Additionally, alternate assemblies or methods of construction will not be allowed by the Trustees based upon not having sufficient lead time to procure FRTW components **after ripping or shaping**.

2. Preservative Treatment:

   a. Treat lumber and plywood sheathing that is:
      i. In contact with concrete and masonry less than six feet above the ground.
      ii. Exposed to weather permanently.
      iii. Where specified in the Contract Documents.

   b. Treat in accordance with AWPA Standards T1 and U1. Verify AWPA Use Category with proposed application prior to selecting preservative.
   c. Treated lumber shall be marked per CBC Section 2303.1.9.
   d. After Treatment and prior to shipping, air- or kiln-dry lumber to maximum 19-percent moisture content.

2.04 SOURCE QUALITY CONTROL

A. Lumber shall be FSC certified and shall bear grade-trademark or be accompanied by certificate of compliance of appropriate grading agency.

B. Plywood shall bear APA grade-trademark.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas to receive rough carpentry Work and verify following:

1. Completion of installation of building components to receive rough carpentry Work.
2. That surfaces are satisfactory to receive Work.
3. That spacing, direction, and details of supports are correct to accommodate installation of blocking, backing, stripping, furring and nailers.
4. That all anchor bolts and holdown bolts are properly installed.

3.02 INSTALLATION

A. Cutting: Perform all cutting, boring, and similar Work required.

B. Studs, Joists, Beams, and Posts: Install all members true to line. No wood shingle shims are permitted. Place joists with crown up; maximum 1/4-inch crown permitted.

C. Nail joints in accordance with applicable requirements of the CBC Table 2304.10.4.1 unless otherwise shown or specified. Predrill where nails tend to split wood. Nails into pressure-treated lumber shall be hot-dipped galvanized.

D. Bolt holes to be 1/16-inch oversize. Threads shall not bear on wood. Use standard malleable iron washers against wood unless noted otherwise on drawings. Carriage bolts require washers under the nut only.

E. Provide blocking, nailers, stripping, and backing as shown and as required to secure other Work.

F. Adjoining sheathing panel edges shall bear and be attached to the framing members. Nails shall be placed not less than 3/8-inch from the panel edge.

G. Do not use plywood sheets having a width smaller than 2-feet 0-inches.

H. Plywood flooring shall be field glued with adhesive meeting APA specification applied in accordance with the manufacturer's recommendations. Apply continuous line of glue on joists and in groove of tongue and groove panels.

I. Protect pressure treated and fire treated lumber per APWA Standard M4, "Standard for the Care of Preservative-Treated Wood Products."

J. Where wood is cut, sawed, planed, bored or marred after preservative or fire-retardant treatment, apply two heavy brush coats of compatible material used in treatment.

K. Nail heads shall be driven flush with plywood surface. Overdriven nails (nails which fracture the outer ply layer) shall be replaced one for one.

L. Screws (Wood or Lag): Screws shall be screwed and not driven into place. Screw holes for un-threaded portion shall be predrilled to the same diameter and depth of shank. Holes for threaded portion shall be predrilled less than or equal to the diameter of the root of the thread. Provide standard cut washers under head of lag screws.

3.03 CLEANING AND ADJUSTING EXPOSED TIMBER

A. Remove damaged or otherwise disfigured portions and replace with new prior to the Owner's acceptance.

B. Wash finished Work in strict accordance with product manufacturer's directions and ensure that washed surfaces do not differ from clean unwashed surfaces. Any difference will be considered unsatisfactory work.

3.04 FIELD QUALITY CONTROL

A. The Owner's Testing Agency shall:

1. Inspect erected timber framing as required to establish conformity of work with Drawings.
2. Inspect high-load diaphragm nailing and support framing per CBC Section 1705.5.1.

3. Inspect elements of the seismic lateral force resisting system per CBC Section 1705.12.2.

    a. Inspect floor and roof diaphragm nailing for nail size, spacing and penetration at plywood panel edges, and special nailing at collector and drag members.
    b. Inspect shear wall nailing for nail size, spacing, edge distance and penetration at plywood panel edges, and nailing at holdown posts.
    c. Inspect all bolted connections of elements that are part of the seismic lateral force resisting system.
    d. Inspect holdown bolts into wood and concrete.

END OF SECTION

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SECTION 07 13 00: SHEET WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Rubberized-asphalt below grade self-adhering sheet flashing waterproofing at all below grade exterior building and site retaining walls.
   2. Rubberized-asphalt self-adhering sheet flashing at exterior window and door openings and other non-roof detail areas.

1.2 PERFORMANCE REQUIREMENTS

A. Provide waterproofing that prevents the passage of water.

1.3 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.

C. Samples: For the following products:

   1. 12-by-12-inch square of waterproofing and flashing sheet.

D. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.

E. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.

F. Sample Warranty: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is authorized, approved, or licensed by waterproofing manufacturer to install manufacturer's products.

B. Source Limitations: Obtain all waterproofing materials through one source from a single manufacturer.

C. Mockups: Apply waterproofing to 100 sq. ft. of deck to demonstrate surface preparation, crack and joint treatment, corner treatment, and execution quality.

1. If Trustees determine mockups do not comply with requirements, reapply waterproofing until mockups are approved.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Meetings." Review requirements for waterproofing, including surface preparation specified under other Sections, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.

C. Remove and replace liquid materials that cannot be applied within their stated shelf life.

D. Store rolls according to manufacturer's written instructions.

E. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

1. Do not apply waterproofing in snow, rain, fog, or mist.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.7 WARRANTY

A. Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to replace waterproofing material that does not comply with requirements or that does not remain watertight during specified warranty period.

1. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16 inch in width.
2. Warranty Period: Three years after date of Substantial Completion.

B. Special Installer's Warranty: Written waterproofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering Work of this Section, for warranty period of two years.

1. Warranty includes removing and reinstalling concrete topping on plaza decks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Products: Subject to compliance with requirements, provide the following products:

1. Rubberized-Asphalt Below Grade Sheet Waterproofing:
   a. Grace Construction Products' "Bituthene 3000"; or approved equal.

2. Rubberized-Asphalt Self-Adhering Sheet Flashing (SASF) (note required compatibility with specified fluid applied weather resistant barrier products):
   a. Fortifiber's "Fortiflash 25 mil"; or approved equal.

2.2 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

1. Furnish liquid-type auxiliary materials that comply with VOC limits of authorities having jurisdiction.

B. Primer: Liquid primer recommended for substrate by manufacturer of sheet waterproofing material.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

D. Sheet Strips: Self-adhering, rubberized-asphalt composite sheet strips of same material and thickness as sheet waterproofing.

E. Liquid Membrane: Elastomeric, two-component liquid, cold fluid applied, trowel grade or low viscosity.

F. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.

G. Mastic, Adhesives, and Tape: Liquid mastic/membrane and adhesives, and adhesive tapes recommended by waterproofing manufacturer.

1. Detail Tape: Two-sided, pressure-sensitive, self-adhering reinforced tape, 4-1/2 inches wide, with a tack-free protective adhesive coating on one side and release film on self-adhering side.
2. Detail Strips: 62.5-mil- thick, felt-reinforced self-adhesive strip, 9 inches wide, with release film on adhesive side.

H. Metal Termination Bars: All vertically applied sheet membranes shall have termination bars applied 1” below finish paving elevation, or 3” below final exposed grade in landscaped areas. Stainless steel bars, approximately 1 by 1/8 inch thick, predrilled at 9-inch centers. All termination bars are to be installed with continuous mastic fillet (Bituthene Liquid Membrane or approved equal) along the top edge.

I. Drainage Composite: All vertically applied sheet membranes shall have drainage composite protection board as recommended by waterproofing manufacturer (Hydroduct 220 for Grace Construction product membranes).

J. Geotextile Fabric: Non-woven polypropylene fiber geotextile fabric: Tencate Mirafi’s “N140”; or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that concrete has cured and aged for minimum time period recommended by waterproofing manufacturer.
2. Verify that concrete is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids.

E. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.

1. Install sheet strips and center over treated construction and contraction joints and cracks exceeding a width of 1/16 inch.

F. Bridge and cover expansion joints and discontinuous deck-to-wall and deck-to-deck joints with overlapping sheet strips.

1. Invert and loosely lay first sheet strip over center of joint. Firmly adhere second sheet strip to first and overlap to substrate.

G. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.

1. Install membrane strips centered over vertical inside corners. Install 3/4-inch fillets of liquid membrane on horizontal inside corners and as follows:
   a. At plaza deck-to-wall intersections, extend liquid membrane or sheet strips onto deck waterproofing and to finished height of sheet flashing.

H. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 PROTECTION AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Clean spillage and soiling from adjacent construction.

END OF SECTION

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SECTION 07 27 00: FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section: Provision of firestopping, fire retardant insulation, and related materials where new construction penetrations occurs in the existing building at existing fire-rated wall construction.

B. Related Work Not Included in this Section:
   1. Provision of non-rated joint sealant.
   2. Provision of thermal insulation.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
   1. American Society for Testing and Materials (ASTM).
   2. Underwriters Laboratories, Inc. (UL).

1.3 QUALITY ASSURANCE

A. Applicator's Qualifications: Applicator of firestopping materials shall be experienced in applying firestopping similar to those specified.

B. Firestopping materials shall be:
   1. Listed in accordance with requirements of UL Fire Resistance Directory.
   2. When tested in accordance with ASTM E119, E84, flame-spread and smoke contributed ratings shall not exceed 25.

C. Form materials to remain in place in the completed Work and sealant used for firestopping Work shall be UL listed.

1.4 SUBMITTALS

A. Product Data.

B. Samples: Only as requested.

C. Certificates: Upon completion of work, furnish written statement signed by the Contractor, applicator, and manufacturer stating firestopping application complies with drawings, specifications, and manufacturer's recommendations and was proper and adequate for conditions requiring firestopping.

D. The Contractor shall submit for approval by the Architect, State Fire Marshal, the UL number and detailed shop drawings of each type of firestop seal assembly to be installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver firestopping materials and related accessories in factory-sealed, unopened containers bearing manufacturer's name, batch number, product designation, and UL label.

B. Storage: Store in unopened containers, off the ground and protected from environmental conditions. Follow manufacturer's recommendations for storage temperature and shelf life.

C. Handling: Follow manufacturer's recommendations for handling products containing toxic materials. Keep flammable material away from heat, sparks, and open flame. Use recommended solvents and cleaning agents for cleaning tools, equipment, and skin.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Apply materials only when surface and ambient temperatures fall within manufacturer-recommended ranges and ventilation and safety requirements are in accordance with manufacturer.

B. Protection:
1. Use masking tape where required to control lap of materials on adjacent surfaces and remove upon completion.
2. Be responsible for damage to adjacent surfaces caused by firestopping operations.
3. Protect firestopping as necessary against damage from other construction activities.

C. Scheduling, Sequencing: Schedule application only after concrete has cured and joints are most likely to be normal size.

PART 2 - PRODUCTS

2.1 PRODUCT

A. General Requirements:
1. Firestopping shall be compatible with contacting material.
2. Firestopping shall not stain adjacent exposed surfaces.
3. Firestopping material shall be free of asbestos.
4. Firestopping material shall provide flame rating as noted for assembly being penetrated as tested in accordance with ASTM E814.

B. Firestopping Typical:
1. Firestopping, Caulking:
a. Description: Endothermic, water base material, single component, ready to use; UL 3 hour fire classification.
b. Product: 3M Contractor Products' "Interam FireDam 150 Caulk"; International Protective Coatings Corp.'s "Flame-Safe FS & FST900 Series"; or approved equal.

2.2 MATERIALS

A. Accessories:
1. Primers, Sealers, Surface Conditioners, Solvents: As recommended by manufacturer of

approved firestopping material for each substrate. Solvents shall be residue-free.
2. Typical Back-Up Material: As recommended by firestopping manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints and spaces to receive firestopping and verify following:
1. That surfaces are satisfactory for proper installation of firestopping.
2. That sprayed fireproofing work has been completed and cured properly.

B. Do not start application until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cleaning:
1. Thoroughly clean receiving surfaces, joints, and spaces of foreign material such as dirt, dust, mill-scale, rust, oil, grease, sealer, curing compound, paint, and other coatings.
2. Blow joints free of loose particles.
3. Use only cleaning materials approved by firestopping manufacturer.

B. Verify proper surface and ambient temperatures.

C. Mask where necessary to protect adjoining surfaces. Remove excess material and stains on surfaces as required.

D. Primers, If Required:
1. Make preliminary tests to insure primers will not stain exposed materials or deteriorate back-up material.
2. Prime surfaces as recommended by firestopping manufacturer immediately prior to sealing.

E. In all other respects, prepare surfaces in accordance with manufacturer's recommendations.

3.3 APPLICATION

A. General Requirements:
1. Apply in exact accordance with manufacturer's specifications to provide fire rating of assembly being penetrated.
2. Use only skilled mechanics on work.
3. Install firestopping with sufficient pressure to properly fill and seal openings.

B. Firestopping:
1. Surface Depth: Provide full depth and width of spaces around penetration, and on each side of wall or partition construction for a depth not less than the thickness of the wall or partition finish materials.
2. Tooling:
a. Using tooling agent recommended by firestopping manufacturer, neatly tool joints to compress material, improve adhesion to surfaces joined, and achieve slightly concave surface.

b. Repair air pockets exposed by tooling.
c. Use masking tape where required to facilitate tooling and remove upon completion.

3. Pipe Penetration: Caulk sleeves set in fire rated construction with sealant specified for fireproof penetration and caulk sleeves set in non-fire rated construction with sealant specified for non-fireproof penetrations. All piping through fire and smoke barriers shall be sleeved and caulked in accordance with a UL listed through-penetration firestop seal assembly.

4. Environmental Duct Penetration: Caulk annular space around environmental duct with firestopping caulking according to manufacturer's instructions, and as required by UL listings.

C. Fire Barrier Assembly:
1. Fire Barrier Assembly at Expansion Control: Follow manufacturer's specifications in preparation of substrate and installation of materials.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Representative: Conduct periodic inspections to ensure adherence to previously approved procedures.

3.5 PATCHING

A. Patch or replace defective and damaged firestopping as directed by the Architect.

3.6 CLEANING

A. Clean adjacent surfaces soiled in applying firestopping in accordance with firestopping manufacturer's recommendations.

B. Remove spilled and excess materials from adjacent surfaces before it has set.

C. Remove all debris and excess materials entirely from site and leave work in a neat and tidy condition.

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 07 54 19: SINGLE-PLY ROOF MEMBRANE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. PVC thermoplastic membrane, Mechanically adhered with fully adhesively applied at areas of vertical parapet wall conditions and mechanical curbs unless otherwise noted.

B. Substrate separation board.

C. Prefabricated flashings, corners, parapets, stacks, vents, and related details.

D. Fasteners, adhesives, and other accessories required for a complete roofing installation.

E. Traffic Protection.

F. Roof Insulation.

G. Roof Tie-Back Anchors (and Fall Protection Design Study)

H. Roof Ladders

I. Roof Curbs

J. Splash Blocks

1.2 RELATED SECTIONS

A. Section 07 60 00 - Flashing and Sheet Metal installation and requirements.

1.3 REFERENCES

A. ASTM D 751 - Standard Test Methods For Coated Fabrics.

B. ASTM D 4434 - Standard Specification For Poly(Vinyl Chloride) Sheet Roofing.

C. ASTM E 108 - Standard Test Methods For Fire Tests of Roof Coverings.

D. ASTM E 119 - Standard Test Methods For Fire Tests of Building Construction and Materials.

E. UL - Roofing Materials and Systems Directory, Roofing Systems (TGFU.R10128).

F. ASCE 7 - Minimum Design Loads For Buildings And Other Structures.

G. ANSI Z359.6 - Specifications And Design Requirements For Active Fall Protection Systems

H. NRCA - The NRCA Roofing and Waterproofing Manual.

I. OSHA 1910 Subpart D Walking Surfaces.

1.4 SYSTEM DESCRIPTION

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing membrane manufacturer based on testing and field experience.

C. Physical Properties

1. Roof product must meet the requirements of Type III PVC sheet roofing as defined by ASTM D 4434 and must meet or exceed the following physical properties.
2. Thickness: 60 mil, nominal, in accordance with ASTM D 751.
3. Breaking Strengths: ≥ 390 lbf. (MD) and 438 lbf. (XMD) in accordance with ASTM D 751, Grab Method.
4. Elongation at Break: ≥ 31% (MD) and ≥ 31% (XMD) in accordance with ASTM D 751, Grab Method.
5. Heat Aging in accordance with ASTM D 3045: 176 °F for 56 days. No sign of cracking, chipping or crazing. (In accordance with ASTM D 4434).
6. Factory Seam Strength: ≥ 431 lbf. in accordance with ASTM D 751, Grab Method.
7. Tearing Strength: ≥ 132 lbf. (MD) and ≥ 163 lbf. (XMD) in accordance with ASTM D 751, Procedure B.
8. Low Temperature Bend (Flexibility): Pass at -40 °F in accordance with ASTM D 2136.
9. Accelerated Weathering: No cracking, checking, crazing, erosion or chalking after 5,000 hours in accordance with ASTM G 154.
10. Linear Dimensional Change: < 0.5% in accordance with ASTM D 1204 at 176 ± 2 °F for 6 hours.
11. Water Absorption: < 2.6% in accordance with ASTM D 570 at 158 °F for 166 hours.
12. Static Puncture Resistance: ≥ 56 lbs. in accordance with ASTM D 5602.
13. Dynamic Puncture Resistance: ≥ 14.7 ft-lbf. in accordance with ASTM D 5635.

D. Cool Roof Rating Council (CRRC) Listing.

1. Membrane must be listed on CRRC website.
   a. Initial Thermal Emittance: ≥ 88%
   b. Initial Solar Reflectance: ≥ 87%
   c. Initial Solar Reflective Index (SRI): ≥ 111
   d. 3-Year Aged Solar Reflectance: ≥ 68%
   e. 3-Year Aged Thermal Emittance: ≥ 84%
   f. 3-Year Aged Solar Reflective Index (SRI): ≥ 82

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.

3. Installation methods.

4. Maintenance requirements.

C. Shop Drawings: Indicate sloped insulation pattern, overall membrane layout, field seam locations, joint or termination detail conditions, location of fasteners, roof slopes and location/size of mock-ups. This also includes fully dimensioned layouts for walkway pads and all roof tie-back anchor locations.

D. Fall Protection Design Study: See requirements outlined in 2.2 F. 2. for Fall Protection Design Study

E. Verification Samples: For each finish product specified, two samples, representing actual product, color, and finish.

1. 4 inch by 6 inch (102 by 150 mm) sample of roofing membrane, of color specified.

2. Sample of roofing membrane with factory weld and T-shaped lap.

3. 4 inch by 6 inch (102 mm by 150 mm) sample of walkway pad.

4. Termination bar, fascia bar with cover, drip edge and gravel stop if to be used.

5. Each fastener type to be used for installing membrane, insulation/recover board, termination bar and edge details.

F. Mock-ups:

1. Provide on-site a 10 foot by 10 foot mock-up with flood test of the roofing system with sloping insulation, substrate separation board, membrane, termination flashing and attachment at an area to include a vertical parapet at the sloped roofing tile for review/approval prior to installation in this area.

2. Provide on-site a 10 foot by 10 foot mock-up with flood test of the roofing system with insulation, substrate separation board, membrane, termination flashing and attachment at an area to include a typical roof drain / roof overflow drain for review/approval prior to installation in this area

G. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

H. Installer Certification: Certification from the roofing system manufacturer that Installer is approved, authorized, or licensed by manufacturer to install roofing system.

I. Manufacturer's warranties.

1.6 QUALITY ASSURANCE

A. Perform work in accordance with manufacturer's installation instructions.

B. Manufacturer Qualifications: Manufacturer must provide at least 3 local references for the proposed brand and type of membrane. Provide contact name and phone number as well as the building address. The building must be commercial with at least 15 years of successful history on the roof. The membrane must be manufactured by the company marketing the roofing product (no “private label” membrane will be accepted), and utilizing a Quality Control Manual during the production of the membrane roofing system that has been approved by and is inspected by Underwriters Laboratories.

C. Installer Qualifications: Company specializing in installation of roofing systems similar to those

specified in this project and approved by the roofing system manufacturer. The installer must provide a letter from the manufacturer confirming at least four years' experience with the product.

D. Source Limitations: Obtain components for membrane roofing system from roofing membrane manufacturer.

E. There shall be no deviations from the roof membrane manufacturer's specifications or the approved shop drawings without the prior written approval of the manufacturer, architect, and owner.

F. Installer shall provide a letter of inspection/acceptance from the roofing membrane manufacturer's representative prior to issuance of the warranty.

G. Special Testing and Inspections for Roof Tie-Back Anchors:

1. Contractor and University to visually inspect drilled holes (cleaned, prepped etc) prior to installation of roof tie-back anchors.

2. University Special Inspector to torque test up to 50% of the installed roof tie-back anchor fastener locations to manufacturer's recommended installation values.

3. University Special Inspector to certify that the installed roof tie-back anchors meet the prescribed ANSI Z359.6 force requirements prior to completion.

1.7 REGULATORY REQUIREMENTS

A. Conform to applicable code for roof assembly wind uplift and fire hazard requirements.

B. Fire Exposure: Provide membrane roofing materials with the following fire-test-response characteristics. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure:
   a. Class A; ASTM E 108, for application and roof slopes indicated.

2. Fire-Resistance Ratings: Comply with ASTM E 119 for fire-resistance-rated roof assemblies of which roofing system is a part.

3. Conform to applicable code for roof assembly fire hazard requirements.

C. Wind Uplift:

1. Roofing System Design: Provide a roofing system designed to resist uplift pressures calculated according to the most recent edition of the ASCE-7 Specification *Minimum Design Loads for Buildings and Other Structures* as a minimum requirement unless noted otherwise in the specifications or drawings.

1.8 PRE-INSTALLATION CONFERENCE

A. Convene a Roof Pre-Installation Conference not less than one week before starting work of this section.

B. Review methods and procedures related to roof deck construction and roofing system including, but not limited to, the following.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency

representative, roofing installer, roofing system manufacturer's representative, deck installer, sheet metal fabricator, and installers whose work interfaces with or affects roofing including installers of roof accessories and roof-mounted equipment.

2. Review and finalize construction schedule and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
4. Review structural loading limitations of roof deck during and after roofing installation.
5. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
6. Review governing regulations and requirements for insurance and certificates if applicable.
7. Review temporary protection requirements for roofing system during and after installation.
8. Review roof observation and repair procedures after roofing installation.

1.9 DELIVERY, STORAGE AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Store roof materials and place equipment in a manner to avoid permanent deflection of deck.

E. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

F. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

G. Handle and store roof materials and place equipment in a manner to avoid permanent deflection of deck.

1.10 PROJECT CONDITIONS

A. Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's specification.

B. Do not apply roofing membrane during inclement weather, or to damp or frozen deck surface or when precipitation is anticipated.

C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed in the same day.

1.11 WARRANTY

A. Contractor Warranty: The contractor shall warrant the roof application with respect to workmanship and proper application for three (3) years from the effective date of the warranty issued by the manufacturer.

B. Manufacturer Warranty: Must provide for completion of repairs, replacement of membrane or total replacement of the roofing system at the then-current material and labor prices throughout the life of the warranty. In addition the warranty must meet the following criteria:

1. Warranty Period: 20 years from date issued by the manufacturer (assume a minimum 80mph wind speed, measured at 10 meters above ground level).
2. First 15 years:
    a. No exclusions for incidental or consequential damages.
3. Last 5 years:
    a. Excludes incidental and consequential damages.
4. No exclusion for damage caused by ponding water.
5. No exclusion for damage caused by biological growth.
6. No exclusion for installation in a marine environment.
7. Issued direct from and serviced by the roof membrane manufacturer.
8. Transferable for the full term of the warranty
9. Within 72 hours of written notification from the University, Contractor/Manufacturer must respond, in writing, with a plan for correction of deficiencies. Should Contractor/Manufacturer not respond within the required deadline noted, the University shall have the right to perform its own repairs at Contractor/Manufacturer's cost without jeopardizing the warranty.

PART 2 PRODUCTS

2.1 MANUFACTURER

A. Manufacturer: Duro-Last Roofing, Inc., Saginaw, MI 48601, 800-248-0280; or approved equal.

B. All roofing system components to be provided or approved by the roofing membrane manufacturer.

2.2 ROOFING SYSTEM COMPONENTS

A. Roofing Membrane: Roofing Membrane conforming to ASTM D 4434, Type III, fabric reinforced, PVC. Membrane properties as follows:

1. Thickness:
    a. 60 mil, nominal (minimum 28 mil over scrim).

2. Exposed Face Color:
    a. White.

B. Accessory Materials: Provide accessory materials supplied by or approved for use by roofing membrane manufacturer:

1. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
2. Factory Prefabricated Flashings: manufactured using Manufacturer's PVC membrane.
    a. Parapet Flashings.
    b. Stack/Boot Flashings at all typical penetrations.
    c. Curb Flashings.
    d. Inside and Outside Corners.
    e. Drain Boots, Composite Drain Rings and Dome Strainers.
    f. Pre-fabricated Vinyl Coated Metal Scupper Inserts.
3. Sealants and Adhesives: Compatible with roofing system. Supplied by roofing membrane manufacturer.
4. Slip Sheet: Compatible with roofing system.
5. Fasteners and Plates: Factory-coated steel fasteners and metal or plastic plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening membrane and insulation to substrate. Supplied by roofing membrane manufacturer.
    a. Heavy Duty Fasteners.
    b. Cleat Plates.
    c. 3 inch Metal Plates.
6. Termination and Edge Details: Supplied by roofing membrane manufacturer.
    a. Termination Bar.
7. Vinyl Coated Metal: Supplied by roofing membrane manufacturer, 24 gauge, hot-dipped galvanized, grade 90 metal with a minimum of 17 mil of roof membrane laminated to one side.
8. Two-Way Roof Vents: Supplied by roofing membrane manufacturer. Install a minimum of 1 vent for each 1,000 ft² (93 m²) of roof area.

C. Substrate Separation Board:

1. Glass-mat-faced, water-resistant gypsum substrate conforming to ASTM C 1177/C 1177M, DensDeck® Roof Board as manufactured by Georgia-Pacific Corporation; or approved equal that satisfies the Class A Roof Assembly listing requirements of the roofing membrane manufacturer. Provide at all roof areas to receive single-ply membrane roofing:
    a. 1/4 inch thick.

D. Substrate Board Attachment:

1. Mechanical fasteners supplied by roofing membrane manufacturer. Fasten per roofing membrane manufacturer specifications.

D. Walkways:

1. Provide non-skid, maintenance-free walkway pads in areas of foot traffic to and around all roof mounted equipment and roof drain locations, supplied by roofing membrane manufacturer.
   a. Duro-Last Roof Trak® III Walkway Pad; or approved equal.

E. Roof Insulation:

1. General: Duro-Last “Duro-Guard EPS Type IX Flat and Tapered Panels”; or approved equal. Provide preformed roof insulation boards that comply with requirements and referenced standards below, selected from manufacturer's standard sizes (note low-slope tapered application required with 1/4” per foot tapered slope typ unless noted otherwise (some areas are 1/16” and 1/8" per foot)– see roof slope plan):
   a. Install insulation per manufacturer’s installation instructions. This includes all accessories required for fitment around all existing roof penetrations.
   b. Thickness: As required to achieve the roof plan designated slope to roof drains.
   c. R Value: Minimum R-Value of 4.76 per inch (at 40 degrees F).
   d. Compressive Resistance: Minimum 25 psi
   e. Dimensional Stability: ASTM D 2126 (less than 2% linear change (7 days)
   f. Moisture Vapor Transmission: ASTM E 96 (less than 2 perm)
   g. Water Absorption: ASTM C272 (less than 2% by volume)
   h. Insulation attachment: Mechanical.
2. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

F. Roof Tie-Back Anchors:

1. General: Summit Anchor Co Inc’s “SM-1” with SM-FOM, 12” tube anchor height, 4-bolt thru-bolted where ceiling access is available below, or 8-bolt expansion anchor where access below is not available, or roof anchor wrapping steel beam (SM-PLT) at Roof Penthouse with steel beam and decking; or approved equal. Specific Models will vary depending on the applicable substrate. Also see 1.6 QUALITY ASSURANCE G. for inspections and special testing requirements.

   Provide roof membrane manufacturer’s custom Roof Flashing with EPDM closure to anchor with stainless-steel roofing termination flashing banding. See Proposed Roof Plan A4.3 for locations.
2. Fall Protection Design Study: Contractor to provide a fully engineered design study for a complete active fall restraint system for this specific roof installation. Design Study will use as a baseline the in-contract roof tie-back anchors as specified above with locations as shown on the Proposed Roof Plan A4.3.

   Provide a design with calculations and testing requirements (by third party engineer hired by contractor). Fall Protection System design will include:

   a) Identify Fall Protection System (including all associated active fall restraint systems, cables, harnesses, equipment, and potential additional locations for roof tie-back anchors). Note Contractor’s bid documents will only provide (beyond the roof tie-back anchors noted in 2.2 F. 1.

above) the submittal of this Fall Protection Design Study. This Study will be used by the University to potentially add scope to the Contractor's Contract for Construction at a future date.

b) Provide documentation illustrating ANSI Z359.6 and OSHA 1910 Subpart D compliance.

c) Show number of workers and provide minimum/maximum forces the system is designed to support in the event of a fall to include the following:

i. Maximum arrest force (MAF).

ii. Deployment of energy absorbers.

iii. Provide the manufacturer, make/model and serial numbers of all system components being proposed.

iv. Provide schematic shop drawings with supporting details and calculations.

v. Document that system is to be tested by a third-party testing agency.

G. Minor Roof Equip Supports (pipes, conduits, and non-structural elements not required to be physically attached to the roof deck):

1. General: Duro-Last's "Caddy Pyramid Rooftop Support System - RL Roller-Based & ST Strut-Based Supports"; or approved equal. Models will vary depending on the applicable elements supported.

H. Roof Ladders:

1. General: Alaco Ladder Company's "Model 561 – Fixed Wall Ladder with Handrails Over Roof" with optional Wall Mounted Lower Support to avoid any support on or penetration of roof insulation/PVC roof membrane; or approved equal.

I. Roof Mechanical Curbs:

1. General: Greenheck's "Standard Curb – GPF" 12" height, with 5" flashing flange, for equipment less than 1,000lbs; or approved equal.

J. Roof Splash Blocks:

1. General: Modern Pre-Cast's "24 inch Splash Blocks" 4" height, 16" wide by 24" long, in white color in white cement; or approved equal.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that the surfaces and site conditions are ready to receive work.

B. Verify that the deck is supported and secured.

C. Verify that the deck is clean and smooth, free of depressions, waves, or projections, and properly sloped to drains, valleys, eaves, scuppers or gutters.

D. Verify that the deck surfaces are dry and free of standing water, ice or snow.

E. Verify that all roof openings or penetrations through the roof are solidly set.

F. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Surfaces shall be clean, smooth, free of fins, sharp edges, loose and foreign material, oil, grease, and bitumen.

3.3 INSTALLATION

A. Install roofing system in accordance with roofing membrane manufacturer's installation instructions.

B. Substrate Separation Board:

1. Use only fasteners, stress plates and fastening patterns accepted for use by roofing membrane manufacturer using fastening patterns that meets applicable design requirements.

   a. Install fasteners in accordance with roofing membrane manufacturer's requirements. Fasteners that are improperly installed shall be removed or corrected.

   b. Attach boards in parallel courses with end joints staggered 50% and adjacent boards butted together with no gaps greater than 1/4 inch (6.3 mm).

B. Roof Membrane:

1. Install in accordance with roofing membrane manufacturer's requirements.

2. Use only fasteners, stress plates and fastening patterns accepted for use by roofing membrane manufacturer using fastening patterns that meets applicable design requirements.

   a. Install fasteners in accordance with roofing membrane manufacturer’s requirements. Fasteners that are improperly installed shall be removed or corrected.

3. Mechanically fasten membrane to the structural deck utilizing fasteners and fastening patterns that in accordance with roofing membrane manufacturer’s requirements.

4. Cut membrane to fit neatly around all penetrations and roof projections.

5. Unroll roofing membrane and positioned with a minimum 6 inch overlap.

C. Seaming:

1. Weld overlapping sheets together using hot air. Minimum weld width is 1-1/2 inches (38 mm).

2. Check welded seams for continuity and integrity by the end of each work day. Repair all imperfections.

D. Membrane Termination/Securement: All membrane terminations shall be completed in accordance with roofing membrane manufacturer's requirements.

1. Provide securement at all membrane terminations at the perimeter of each roof level, roof section, curb flashing, skylight, expansion joint, interior wall, penthouse, and other similar condition.
2. Provide securement at any angle change where the slope or combined slopes exceeds two inches in one horizontal foot.

E. Flashings: Complete all flashings and terminations as indicated on the Drawings and in accordance with roofing membrane manufacturer's requirements.

1. Provide securement at all membrane terminations at the perimeter of each roof level, roof section, curb flashing, skylight, expansion joint, interior wall, penthouse, and other similar condition.
   a. Do not apply flashing over existing thru-wall flashings or weep holes.
   b. Secure flashing on a vertical surfaces before the seam between the flashing and the main roof sheet is completed.
   c. Extend flashing membrane a minimum of 6 inches (152 mm) onto the main roof sheet beyond the mechanical securement.
   d. Use care to ensure that the flashing does not bridge locations where there is a change in direction (e.g. where the parapet meets the roof deck).
2. Penetrations:
   a. Flash all pipes, supports, soil stacks, cold vents, and other penetrations passing through the roofing membrane as indicated on the Drawings and in accordance with roofing membrane manufacturer's requirements.
   b. Utilize custom prefabricated flashings supplied by roofing membrane manufacturer.
   c. Existing Flashings: Remove when necessary to allow new flashing to terminate directly to the penetration.
3. Pipe Clusters and Unusual Shapes:
   a. Clusters of pipes or other penetrations which cannot be sealed with prefabricated membrane flashings shall be sealed by surrounding them with a prefabricated vinyl-coated metal pitch pan and pourable sealer supplied by roofing membrane manufacturer.
   b. Vinyl-coated metal pitch pans shall be installed, flashed and filled with pourable sealer in accordance with roofing membrane manufacturer's requirements.
   c. Pitch pans shall not be used where prefabricated or field fabricated flashings are possible.

F. Roof Drains:

1. Coordinate installation of roof drains and vents specified.
2. Remove existing flashing and asphalt at existing drains in preparation for sealant and membrane.
3. Provide a smooth clean surface on the mating surface between the clamping ring and the drain base.

G. Edge Details:

1. Provide edge details as indicated on the Drawings. Install in accordance with roofing membrane manufacturer's requirements.
2. Seal joints between individual sections in accordance with roofing membrane manufacturer's requirements.
3. Coordinate installation of metal flashing and counter flashing.
4. Manufactured Roof Specialties: Coordinate installation of copings, counter flashing systems, gutters, downspouts, and roof expansion assemblies.

H. Walkways: Install walkways in accordance with roofing membrane manufacturer's requirements.

1. Provide walkways where indicated on the Drawings and as noted in 2. below.
2. Install at roof hatches, access doors, rooftop ladders and all other traffic concentration points regardless of traffic frequency. Provided in areas receiving regular traffic to service rooftop units or where a passageway over the surface is required.
3. Do not install walkways over flashings or fields seams until field inspections by roofing membrane manufacturer have been completed.

I. Water cut-offs: Provide water cut-offs to ensure that water does not flow beneath the completed sections of the new roofing system.

1. Provide water cut-offs on a daily basis at the completion of work and at the onset of inclement weather.
2. Remove water cut-offs prior to the resumption of work.
3. The integrity of the water cut-off is the sole responsibility of the roofing contractor.
4. Any membrane contaminated by the cut-off material shall be cleaned or removed.

3.4 FIELD QUALITY CONTROL

A. Owner, Architect, and Roofing membrane manufacturer's representative shall provide a comprehensive inspection at the following completion milestones:

1. At the initial installation of approximately 15% of typical roof membrane area.
2. Final inspection at completion of all roof areas.

B. All application errors shall be addressed and final punch list completed before final acceptance of roof installation.

3.5 PROTECTION

A. Protect installed roofing products from construction operations until completion of project.

B. Clean debris, fasteners, etc from all areas of roof membrane installation at the end of each day to prevent damage.

C. Where traffic must continue over completed roofing membrane, protect from damage using durable materials that are not incompatible with membrane.

D. Repair or replace damaged products before Substantial Completion.

END OF SECTION

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SECTION 07 60 00: FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section: Provision of flashing and sheet metal work as shown or noted. Only more important items are shown or noted. Items include, but are not necessarily limited to, the following:
   1. Flashing and counterflashing, misc gauge metal brake shapes associated with minor structural framing.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
   1. American Society for Testing and Materials (ASTM).
   2. Federal Specifications (Fed. Spec.).
   3. Sheet Metal and Air Conditioning Contractors National Assoc. Inc.'s "Architectural Sheet Metal Manual 7th Edition 2012" (SMACNA).
   4. American Welding Society's
      a. "Structural Welding Code - Steel" (AWS D1.1: 2015).
      b. "Structural Welding Code - Sheet Steel" (AWS D1.3: 2008).

1.3 SUBMITTALS

A. Product Data.

B. Shop Drawings: Show items in detail prior to fabrication.

C. Samples: Samples only as requested.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle packaged materials in original containers with seals unbroken and labels intact until time of use.

B. Store delivered products in clean, safe, dry area.

1.5 JOB CONDITIONS

A. Temporary Protection:
   1. Typical Exposed Finishes: Protect as required against construction damage; remove prior to final acceptance.

B. Scheduling, Sequencing: Insure timely delivery of items to be embedded in work of other sections and furnish setting drawings or templates and setting instructions for exact installation.

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PART 2 - PRODUCTS

2.1 BASIC MATERIALS AND ACCESSORIES

A. Sheet Metals:
   1. Galvanized Sheet Steel: ASTM A653-17, ASTM A924-17; minimum 24 gauge; galvanized steel fastenings.
   2. Precoated Galvanized Steel: ASTM A653-17, ASTM A924-17; Shop precoated with coating of Trustee selected color.
   3. Copper: ASTM B370-12; temper H00 (cold rolled) except where temper 060 is required for forming; 16 oz per square foot (0.0216 inch thick).

B. Solder and Flux Items: Remelted or reworked solder will not be permitted. Types as recommended by manufacturer of sheet metal to be soldered.

C. Flashing Compound:
   1. Description: Polyisobutylene type, nonskinning, nondrying sealant, bulk or tape as required by installation conditions. Tape shall be 1 inch minimum width, 1/16 inch minimum thickness.
   2. Product: United Technologies Corp., Presstite Products' "Permagum 579.6 and 579.64"; Cushion-Lok Div. of Morrison and Co.'s "CL-50"; or approved equal.

D. Items for Permanent Protection of Dissimilar Metals and Materials:
   1. Asphalt-Saturated Felt: ASTM D226-17.
   2. Bituminous Paint: Fed. Spec. TT-C-494B.
   3. Compressible Tape: ASTM C509-06 (2015). Closed cell black neoprene tape, size as noted, with adhesive system as recommended by manufacturer.

E. Items for Permanent Protection of Aluminum form Dissimilar Metals and Materials:
   1. Formerly Zinc Chromate Primer (VOC compliant): (meeting Fed Spec TT-P-641G) ICI's No. 4120 Devguard "Multi-Purpose Metal Primer"; or approved equal.
   2. Rust-Inhibiting Primer: (meeting Fed Spec TT-P-641G, TT-P-645B, TT-P-615D, TT-P-636D) ICI's No. 4160 Devguard "Multi-Purpose Tank & Structural Primer"; or approved equal.
   3. Aluminum Metal and Masonry Paint: (meeting Fed Spec TT-P-641G) ICI's No. 4348 Devguard "Alkyd Industrial Enamel"; or approved equal.
   4. Bituminous Paint: Fed. Spec. TT-C-494B.
   5. Compressible Tape: Closed cell black neoprene tape meeting requirements of ASTM C509-06(2015), size as noted, with adhesive system as recommended by the manufacturer.
   6. Polyisobutylene Sealant: Nonskinning, nondrying sealant. United Technologies Corp., Presstite Products' "Permagum 579.6 and 579.64"; Cushion-Lok, Division of Morrison and Co.'s "CL-50"; or approved equal.

2.2 FABRICATION

A. Preparation: Verify measurements in field and coordinate with related work as required for proper and adequate fabrication and installation.

B. General Requirements:
   1. Items of standard manufacture may be furnished in lieu of specially fabricated items provided such items meet requirements shown or noted.
   2. As far as practicable, form and fabricate sheet metal items in shop. Where circumstances

require on-site fabrication provide quality equal to shop work.

3. Accurately reproduce profiles and bends as shown or noted. Ensure that intersections are sharp, even, and true; that plane surfaces are free from buckles and waves; that seams follow direction of water flow.
4. Where work is not otherwise shown or noted, design and fabricate in accordance with SMACNA Architectural Sheet Metal Manual.
5. Reinforce properly as required for strength and appearance.
6. Cut, fit, and drill sheet metal as required to accommodate accessory items and work adjacent or adjoining.
7. Exposed Edges of Sheet Metal: Fold, bead, or return; no raw edges will be permitted.

C. Sheet Metal Usage:
1. Where items are noted as typical sheet metal, use galvanized sheet steel of thickness noted under Materials article unless otherwise noted.
2. Flashing and counterflashing is required at all areas of potentially exposed roofing underlayment for UV protection..

D. Sheet Metal Joints:
1. In general, provide lock joints; where impractical, lap, rivet, and solder.
2. Turn lock joints on exposed surfaces in direction of flow.
3. Solder joints and miters.
4. Where positive joining is required, arc-weld in accordance with AWS D1.1-2015, AWS D1.3-2008, or braze.

E. Soldering:
1. Pre-tin edges 1-1/2 inch both sides prior to soldering.
2. Use heavy soldering coppers of blunt design.
3. Immediately after applying flux, solder slowly with well-heated coppers, thoroughly heating seams and completely sweating solder through full width with at least 1 inch width along seams.
4. After soldering, immediately neutralize any acid flux and flush with clean water.

F. Expansion-Contraction of Sheet Metal Runs: Provide loose locking slip joint at maximum 8 feet from external or internal corners, at every 24 feet of straight runs unless manufacturer recommends more frequent interval, and 1 at center of runs less than 20 feet but more than 8 feet long.

G. Flashing and Counterflashing:
1. Fabricate runs in maximum lengths subject to expansion-contraction allowance with minimum number of joints.
2. Form counterflashings to lock rigidly into reglets where required.
3. Exposed Edges: Turn back and hem 1/2 inch.

2.3 FINISHES

A. Sheet Metal: Manufacturer's standard finish unless otherwise noted.
1. Galvanized Sheet Steel: After fabrication, touch-up abraded surfaces.

B. Permanent Protection of Dissimilar Metals and Materials:
1. Items in Contact with Dissimilar Metals: Protect as required to prevent corrosion and discoloration from galvanic action.

2. Items in Contact with Concrete, Masonry Mortar, or Plaster or Not Accessible After Installation: Underlay items with asphalt-saturated felt or apply heavy coating of bituminous paint at areas of contact.
3. Items in Contact with Moisture Absorbent Materials or Preservative-Treated Wood: Apply heavy coating of bituminous paint to such items including lead and excepting stainless steel.
4. Fasteners and Anchors of Materials Dissimilar from Items Fastened: Mask as required to prevent corrosion and discoloration from galvanic action.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive items and verify following:
   1. That dimensions are correct to receive items.
   2. That adjacent or adjoining surfaces are clean, dry, reasonably smooth, and free from defects; that wood surfaces to be in contact with sheet metal are free from projecting nails.
   3. Absence of other conditions that will adversely affect installation.

B. Do not start work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate as required with installation of related work.

B. Where flashing and sheet metal work is related to asphalt shingle roofing, install under supervision of roofing installer.

3.3 INSTALLATION

A. General Requirements:
   1. Install items in accordance with SMACNA unless otherwise noted.
   2. Where installation requires performing work of fabrication, meet requirements of applicable standards of Fabrication Article.
   3. Apply flashing compound at slip joints or wherever else metal-to-metal contact occurs and movement may be anticipated.
   4. Unless otherwise noted or required by manufacturer, fasten sheet metal runs to underlying material by nailing through slotted holes in flange at 3 inches on center. Provide waterproof washers wherever required fasteners penetrate flashings. Where sheet metal occurs over roofing materials or other sheet metal, use nails with 1 inch metal disks.
   5. Insure that items are installed in true and accurate alignment with other items and related work; that joints are accurately fitted; that exposed surfaces are free from dents; that corners are reinforced; that seams are watertight.

B. Flashing and Counterflashing: Where lips and caulking are not practical for securing items in reglets, use lead wool packed tight with lead wedges on vertical surfaces and molten lead on horizontal surfaces.

END OF SECTION

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SECTION 07 92 00: JOINT SEALERS

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section: Provision and installation of sealants and related materials to provide a weather tight building as specified in this section including but not limited to the following:
   1. Preparing sealant substrate surfaces
   2. Sealant and backing
   3. Caulking at painted interior surfaces
   4. Acoustical sealant

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
   1. American Society for Testing and Materials (ASTM).
   2. National Association of Architectural Metal Manufacturers' "Specification for Dense Rubber-Like Compression Gasket Material" (NAAMM Standard SG-1-70).
   3. Federal Specification (FS)

A. References:
   1. ASTM C1193-16 – Standard Guide for Use of Joint Sealants
   2. FS TT-S-00227 – Sealing Compound: Elastomeric Type, Multi Component.
   3. FS TT-S-00230 – Sealing Compound: Elastomeric Type, Single Component.
   4. FS TT-S-001543 – Sealing Compound: Silicone Rubber Base.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Manufacturer of sealants shall be experienced in producing sealants similar to those specified for a minimum of fifteen years.

B. Applicator's Qualifications: Applicator of sealants shall be experienced in applying sealants similar to those specified for a minimum of three years.

C. Demonstration:
   1. After the Trustees 's review of sealant materials and application procedures, and prior to sealant installation, arrange for applicator to demonstrate application procedure under observation of sealant manufacturer's representative, the Contractor, and the Trustees.
   2. Demonstration shall consist of completely sealing at a location determined by the Trustees and shall include all phases of application including preparing joint, priming where required, installing back-up material, applying sealant, and tooling.

D. Joint Sealers shall have a 10-year warranty.

1.4 SUBMITTALS

A. Product Data.

B. Samples:
   1. Exposed sealants for color selection.
   2. Sealant beads applied to actual materials used in project for testing adhesion.
   3. Other Samples only as requested.
   4. Certificates: Upon completion of work, furnish written statement signed by the Contractor, applicator, and manufacturer stating sealant application complies with drawings, specifications, and manufacturer's recommendations and was proper and adequate for conditions requiring sealant.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver sealants and related accessories in factory-sealed, unopened containers bearing manufacturer's name, batch number, and product designation.

B. Storage: Store in unopened containers. Follow manufacturer's recommendations for storage temperature and shelf life.

C. Handling: Follow manufacturer's recommendations for handling products containing toxic materials. Keep flammable material away from heat, sparks, and open flame. Use recommended solvents and cleaning agents for cleaning tools, equipment, and skin.

1.6 PROJECT CONDITIONS

A. Environmental Requirements: Apply materials only when surface and ambient temperatures fall within manufacturer-recommended ranges.

B. Protection:
   1. Use masking tape where required to control lap of materials on adjacent surfaces and remove upon completion.
   2. Be responsible for damage to adjacent surfaces caused by sealant operations.

C. Scheduling, Sequencing: Schedule application only after concrete has cured and joints are most likely to be normal size.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Sealants:
   1. General Requirements:
      a. Sealant systems shall be compatible with contacting membranes, premolded joint filler, and fluid applied waterproofing systems.
      b. Sealant systems shall not stain adjacent exposed surfaces.
      c. In general, manufacturer’s standard color range is required to allow matching color of sealant to adjacent materials. Assume a minimum of six standard and four custom colors

are to be provided for each sealant type.

2. **Sealant Type 1**: One-part ultra-low modulus neutral cure silicone sealant. Comply with ASTM C920. Dow Corning's "790 silicone Building Sealant"; or approved equal.

3. **Sealant Type 2**: Multi-part Polyurethane Base, Shore A hardness of 35 typical. Comply with FS TT-S-99227E or TT-00230C, Class A, Type I, (self-leveling) or Class A, Type II (Nonsag) and ASTM C920, Type M, Grade P, Class 25. Tremco's "THC/900"; or approved equal.

4. **Sealant Type 3**: One-part Silicone Sealant. Comply with FS TT-S-001543A, and ASTM C920, Type S, Grade NS, Class 25 with mildew resistant additive. GE's "SCS 1702 Sanitary Sealant"; or approved equal.

5. **Sealant Type 4**: One-part Silicone Modified Polyether sealant (paintable). Comply with FS TT-S-00230C Type II, Class A and ASTM C920 and C1520. GE's "SCS7000 Advanced Silicone Technology"; or approved equal.

6. **Sealant Type 5**: Latex-based acoustical sealant. ASTM E-84. Acceptable to be used in any fire-rated wall assemblies from 1 to 3 hours without any adverse effect on assembly fire performance. USG Sheetrock Brand's "Acoustical Sealant"; or approved equal.

B. Colors:
   1. Sealant Type 3, 4, and 5 shall be colors selected by Architect from manufacturer's standard color range.
   2. Sealant Type 1 and 2 shall be custom mixed colors (Architect to provide direction as to colors to match). Assume minimum 3 custom mixed colors are to be selected for each sealant type. Custom color mixing will be required regardless of actual quantity required versus manufacturer's minimum quantities for color mixing.

C. Accessories:
   1. Primers, Sealers, Surface Conditioners, Solvents: As recommended by manufacturer of approved sealant material for each substrate. Solvents shall be residue-free.
   2. Typical Back-Up Material, Fillers, Joint Packing, Etc.: Nonstaining, closed-cell flexible foam or sponge as recommended by manufacturer of approved sealant material. Incompressible materials or acrylic-, asphalt-, oil-, or solvent-containing materials will not be permitted.
   3. Release Material: as recommended by sealant manufacturer.
   4. Cleaning Materials: Nonstaining and not otherwise injurious to exposed surfaces; for metal and glass, use xylol, tolerol, or methyl ethyl ketone.

2.2 MIXING

A. Multi-Component Sealants:
   1. Mix at job site with suitable power-operated equipment.
   2. Ensure components are mixed with identical batch control numbers.

2.3 SOURCE QUALITY CONTROL

A. Multi-Component Sealants:
   1. Manufacturer's Representative: Inspect and approve mixing equipment at start of work and continue to conduct periodic inspections as required to ensure maintenance of mixing

equipment in proper working conditions and adherence to previously approved procedures.

2. Applicator:
   a. Apply button or plug from each cartridge on approved preprinted card.
   b. Cross-reference card to location where cartridge is applied and note batch or cartridge number, and date of mixing and application.
   c. Protect cards from damage until plugs have cured and then submit to Project Inspector who will retain cards until completion of work and use cards to identify potential areas of defective sealant material.

B. One-Component Sealant: Prepare and submit plug cards same as for multi-component sealants.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints and spaces to receive sealant and verify following:
   1. That surfaces are free from bituminous materials, form release agents, bond breakers, deleterious curing compounds, water repellants, or other special surface treatments.
   2. That metallic surfaces are free from rust, mill-scale, coatings, oil, and grease.
   3. Absence or removal of protective materials from aluminum surfaces.
   4. That concrete, plaster, or masonry surfaces have properly cured.
   5. That joints and spaces requiring sealing are at correct or normal width.

B. Do not start application until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Cleaning:
   1. Thoroughly clean receiving surfaces, joints, and spaces of foreign material such as dirt, dust, mill-scale, rust, oil, and grease.
   2. Blow joints free of loose particles.
   3. Use only cleaning materials approved by sealant manufacturer; do not use soap, detergents, or water-based cleaners on masonry, metal, or glass.
   4. Do not permit solvents to air dry; wipe surfaces free of solvent using clean, dry white cloth or white lintless paper.

B. Remove moisture and frost.

C. Verify proper surface and ambient temperatures.

D. Primers:
   1. Make preliminary tests to insure primers will not stain exposed materials or deteriorate back-up material.
   2. Prime surfaces as recommended by sealant manufacturer immediately prior to sealing.

E. In all other respects, prepare surfaces in accordance with manufacturer's recommendations.

3.3 APPLICATION

A. General Requirements:

1. Apply in exact accordance with manufacturer's specifications and procedures established during demonstration.
2. Use only skilled mechanics on work.
3. Do not obstruct weep systems.

B. Sealants:
   1. Bonding Surface Depths: Control depths with back-up material; in placing preformed bead or rope types, do not twist or bend.
      a. Typical Joints: 1/4 inch.
      b. Concrete Joints Where Movement is Expected: 1/2 to 3/4 inch.
      c. Joints Less than 1/2 Inch Wide: From 1/2 width to full width of joint.
      d. Joints Greater than 1/2 Inch Wide, but No Greater than Two Inches: 1/2 width of joint.
   2. Release Materials:
      a. Use release material between back-up material and sealant where required to confine adhesion of sealant to surfaces of materials joined.
      b. Conditions requiring release materials include, but are not necessarily limited to, joints subject to movement where sealant would otherwise contact back of joint or adhere to back-up materials and over support backing at traffic-bearing joints.
      c. Release material will not be required where back-up material is polyethylene.
   3. Tooling:
      a. Using tooling agent recommended by sealant manufacturer, neatly tool joints to compress material, improve adhesion to surfaces joined, and achieve slightly concave surface.
      b. Repair air pockets exposed by tooling.
      c. Use masking tape where required to facilitate tooling and remove upon completion.

C. Schedule:
   1. Locations: All open joints which permit the entrance of air, water, or dust or light shall be sealed, both inside and outside of the building. In addition, all joints between dissimilar materials that result in irregular or open intersections shall be sealed.
   2. Exterior Joints:
      a. Exterior sills, jambs and heads of window frames, door frames, louvers, and similar openings and where metal, wood, or other materials abut or join masonry, concrete, or each other shall have sealant applies around their perimeters.
         Sealants No. 1.
      b. Vertical expansion and control joints.
         Sealants No. 1.
      c. Horizontal joints in terraces, decks, concrete floors, and driveways.
         Sealant No. 2.
      d. Exterior sills, jambs, and heads of window frames having insulated glass.
         Sealant No.1.
   3. Interior Joints:
      a. Vertical expansion and control joints.
         Sealants No. 4.
      b. Horizontal expansion and control joints.
         Sealant No. 2.
      c. For sink.
         Sealant No. 3.
      d. For interior caulking at joints to receive painted finish.
         Sealant No. 4.
      e. For interior caulking at sound isolation perimeter joints requiring acoustical sealant to receive painted finish (including fire-rated assemblies).

Sealant No. 5.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Representative: Conduct periodic inspections to ensure adherence to previously approved procedures.

3.5 PATCHING

A. Patch or replace defective and damaged sealants as directed by the Trustees.

3.6 CLEANING

A. Clean adjacent surfaces soiled in applying sealants in accordance with sealant manufacturer's recommendations.

B. Remove wet material from adjacent surfaces before it has set.

C. Do not use cleaning agents.

END OF SECTION

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SECTION 09 10 00: METAL SUPPORT SYSTEMS

PART 1 GENERAL

1.01 SUMMARY

A. Work Included in this Section:
1. Provision of metal studs, furring, and suspension systems for support of gypsum wallboard and lath and plaster walls, ceilings, and soffits.
2. Provision of backing plates for items adjoining or fastening to these systems unless otherwise noted.
3. Provision of miscellaneous metal items for attaching stud framing to structure.
4. Provision of joist framing at corridors.
5. Provision of channel reinforcement at metal frames and glazed partition frames.

B. Related Work Not Included in this Section:
1. Provision of collateral materials including gypsum wallboard, lath and plaster, and their accessories and fasteners.
2. Provision of backing plates for plumbing fixtures.
3. Provision of resilient channel.

1.02 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or government organizations apply to work of this Section where cited by abbreviations noted below.
1. Federal Specifications (Fed. Spec.).
2. American Society for Testing and Materials (ASTM).
3. Metal Lath/Steel Framing Association's "Guide Specifications for Metal Lathing and Furring", 920-91, and "Metal Lath Technical Bulletins" (ML/SFA).
4. American Welding Society's "Structural Welding Code - Steel" (AWS D1.1-2015).
5. State of California, California Building Code, Title 24 (CBC).

1.03 SYSTEM DESCRIPTION

A. Design Requirements:
1. Metal studs and furring shall provide plumb, true, straight, and rigid framing for support of collateral materials and shall meet requirements of CBC.

1.04 SUBMITTALS

A. Product Data.

B. Shop Drawings: Show provisions for heavy fixture anchorage to stud systems and for backing system which differs from typical details. Show all items noted as break shapes or furring clips which require custom fabrication.

C. Samples: Only as requested.

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1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in original packages, containers, or bundles bearing brand name and name of manufacturer or supplier for whom product is manufactured with seals unbroken and labels intact until time for use.

PART 2 PRODUCTS

2.01 MATERIALS

A. Metal Studs: Conform to types and sizes as noted.
   1. 16 Gauge (1.6 mm) C Studs:
      a. Description: C-shaped sections cold formed with punched webs and 1-5/8 inch (41.3 mm) plain or perforated flanges to receive screws; fabricated from 16 gauge (1.6 mm) hot dipped galvanized steel meeting requirements of ASTM A568-17a or ASTM A1011-17a, with minimum yield point of 50,000 psi (344 737 850 Pa) and with G-60 galvanized coating in accordance with ASTM A653-17.
      b. Product: Western Metal Lath Co.'s "WCS Punched No. 158 Cee Studs"; or approved equal.

B. Joists: 16 Gauge (1.6 mm) Metal Joists.

C. Runner Tracks:
   1. 16 gauge (1.6 mm) hot dipped galvanized steel meeting requirements of ASTM ASTM A568-17a or ASTM A1011-17a with minimum yield point of 50,000 psi and with G-60 galvanized coating in accordance with ASTM A653-17.
   2. 16 gauge Deep Leg Track, formed from 16 gauge (1.6 mm) steel with minimum 1-1/2 inch (38.1 mm) flanges, unpunched webs and meeting requirements of ASTM ASTM A568-17a or ASTM A1011-17a, Grade 50; hot-dipped galvanized finish.
      Product: Western Metal Lath Co.'s "T-DL Unpunched Deep Leg Tracks"; or approved equal.
   3. 16 Gauge Deflection and Firestop Track, hot dipped galvanized 16 gauge steel meeting requirements of ASTM A653-17 with minimum yield point of 50,000 psi ceiling runner designed to allow head-of-walls to compress or extend with movement of structure above while maintaining the fire-rating of the wall assembly. The fire-rated assembly shall be capable of 2” of movement (1” compression and 1” extension) and be tested and listed by a code approved laboratory to accommodate the required movement, ASTM A-924-17a G-60 galvanized finish.
      Product: Fire Trak Corp’s "Fire Trak Shadowline HW-D-0060"; or approved equal.

D. Channels:
   1. Typical for Framing, Furring, and Carrying Channels: Cold-rolled steel coated with rust-inhibitive material, with following minimum weights per 1000 lineal feet (304.8 m), subject to standard mill weight tolerances:

Size Inches (mm)	Gauge (mm)	Pounds (kg)
3/4 (19.1)	16 (1.6)	300 (136.1)
1-1/2 (38.1)	16 (1.6)	475 (215.5)
2 (50.8)	16 (1.6)	590 (267.6)

2. Main Carrying Channels at Gypsum Wallboard Suspended Ceiling Only: 1-1/2 inch (38.1 mm) hot-rolled steel carrying channels coated with rust-inhibitive material or galvanized and weighing 1.12 pounds per lineal foot (1.67 kilogram per meter).
3. Furring (Hat) Channels, Screw-on Type: 7/8 inch (22.23 mm) formed from 25 gauge (0.6 mm) galvanized steel with either plain or perforated flanges to receive screws.
4. "Z" Furring Channels:
   a. Description: Corrosion-resistant steel; furring depth of 2 inches (50.8 mm) unless otherwise noted.
   b. Product: United States Gypsum Co.'s "USG Z-Furring Channels"; Angeles Metal Systems' "A-Furring Channel"; or approved equal.

E. Adjustable Wall Furring Bracket: 20 gauge (0.8 mm) galvanized steel with serrated edges.

F. Partition Bridging: Cold-rolled channel or stud manufacturer's standard bridging for approved stud.

G. Typical Backing Plates: 1/4 inch (6.35 mm), 7 gauge (4.5 mm), 12 gauge (2.8 mm), 14 gauge (1.9 mm), and 16 gauge (1.6 mm) unpunched studs, flat plates, and bent plates, profile as shown.

H. Channel Reinforcement at Metal Frames and Glazed Partition Frames: 10 gauge (3.5 mm) cold-rolled steel channel with legs and widths as noted; weld where shown and coat with rust-inhibitive material.

I. Miscellaneous Metal Items: Meet requirements of Metal Fabrications Section.
   1. Straps, Plates, Bent Plates and Clip Angles: Thickness and dimensions as shown.
   2. Closures at Metal Decking: 18 gauge (1.5 mm) steel angles and sheets as noted typical (see structural for specific edge conditions for exterior cladding support.
   3. Zee Clips: 12 gauge (2.8 mm) sheet metal, dimensions as shown.
   4. Steel Angle Clip for Suspension System: Fabricate from 12 gauge (2.8 mm) steel, 1 inch (25.4 mm) wide by 2 inch (50.8 mm) long with holes to receive fastener and bracing wires, profile as shown, galvanized after fabrication.
   5. Custom Furring and Break Shapes: 20 gauge min (unless noted otherwise in drawings) hot dipped galvanized steel meeting requirements of ASTM A653-17, Grade A, G-60 coating fabricated to shapes shown in drawings. All furring and/or break shapes associated with exterior wall assemblies shall be 16 gauge min (unless noted otherwise in drawings) hot dipped galvanized steel meeting requirements of ASTM A653-17, Grade A, G-60 coating fabricated to shapes shown in drawings.

J. Fasteners:
   1. Powder Driven Fasteners: Tempered steel pins, minimum 0.145 inch (3.6 mm) diameter, with special corrosive-resistant plating or coating. Pins shall have guide washers to accurately control penetration, minimum 1-1/4 inches (31.8 mm) unless otherwise noted. Fastening shall be accomplished by low-velocity piston-driven powder-actuated tool. Pins and tool shall be same as manufactured by Hilti Inc.; Impex Tool Corp.; or approved equal.
   2. Pin and Clip Anchors for Vertical Hanger Wires at Gypsum Board Ceiling Only: Hilti Inc.'s "No. CC27DN27P8T Suspended Ceiling Clip"; or approved equal.
   3. Sheet Metal Screws: Self-drilling and self-tapping, No. [8] [10] flat pan head. "Grabber (Sub 76); or approved equal.

4. Concrete Screws:
   a. Description: Heat treated screws with unique Hi-Lo thread design that cuts threads in pre-drilled holes in concrete.
   b. Product: ITW Buildex's "Tapcon Anchors"; "; or approved equal.
5. Expansion Anchors: Meet requirements of Metal Fabrications Section.
6. Expansion Eye Anchors: ITW Ramset/Red Head's "Dynabolt, Tie Wire TW-1614"; or approved equal. Allowable capacity shall not exceed 80 percent of the allowable load listed in the ICBO Research Committee Recommendation for the specific anchor. Design loads and minimum embedment in 3000 psi (20 684 271 Pa) stone aggregate concrete are noted in table below. The allowable capacity shall be equal to or greater than design load.

BOLT DIA. INCHES (mm)	MIN. EMBEDMENT INCHES (mm)	SHEAR LBS (kg)	TENSION* LBS (kg)
5/16 (7.94)	1-1/2 (38.1)	444	384

   * = with special inspection

7. Machine Bolts, Nuts, and Washers: Low carbon steel standard fasteners, externally and internally threaded, ASTM A307-97; malleable washers.

K. Hanger, Bracing and Tie Wires: Fed. Spec. QQ-W-461H, Finish 5, Class 1, soft temper or ASTM A641-09a(2014), Class 1 coating, soft temper. Minimum gauges (mm): Hangers, 8 (4 mm); Diagonal bracing wire, 12 (2.5mm); Single-strand tie wire, 16 (1.6mm); Double-strand tie wire, 18 (1.2mm).

L. Galvanized Finish Touch-Up Coating:
   1. Description: Liquid zinc compound that bonds electrochemically to iron, steel and aluminum.
   2. Product: ZRC Chemical Products' "Z.R.C. Cold Galvanizing Compound"; Brite Products' "Brite Zinc AE"; or approved equal.

M. Rust-Inhibitive Touch-Up Coating: Fuller-O'Brien Corp.'s No. 621-04; Sinclair Paints' No. 15; or approved equal.

PART 3 EXECUTION

3.01 PREPARATION

A. Coordinate details and requirements of other work which adjoins or fastens to metal studs or furring and requires backing or special support framing included in this Section.
   1. Items requiring backing or support include, but are not necessarily limited to, casework, wall-mounted finish hardware, miscellaneous specialties, handrail brackets, and similar items.
   2. Obtain the Architect's approval of backing method proposed to satisfy requirements of this Section which differs from methods noted or shown.

B. Install suspension system components to be embedded.

3.02 INSTALLATION

A. General Requirements:
   1. Securely fasten framing members together and to walls, floors, and other structural supports.
   2. Drop-In Expansion Anchors: Use for floor installation only. NOT permitted for use in overhead or vertical surfaces.
   3. Wire-Tying:
      a. Hangers shall be saddle-tied around main runners to develop the full strength of the hangers.
      b. Cross-furring shall be saddle-tied to the main runners with one strand of No. 16 gage (1.6 mm) or two strands of No. 18 gage (1.2 mm) tie wire.
      c. Main runners shall be spliced by lapping and interlocking flanges 12 inch (304.8 mm) minimum and tying near each end with double loops of No. 16 (1.6 mm) gage wire and positively attach together as shown on drawings.
      d. Cross-furring shall be spliced by lapping and interlocking the pieces 8 inch (203.2 mm) minimum and tying near each end with double loops of No. 16 gage (1.6 mm) wire.
      e. Wrap vertical hanger wires minimum 3 tight turns within a distance of 1-1/2 inches (38.1 mm) and 4 tight turns within a distance of 1-1/2 inches (38.1 mm) for diagonal bracing wires.
   4. Welding:
      a. Perform all welding in accordance with AWS D1.1-2015 and by welders previously qualified for horizontal, vertical, and overhead positions.
      b. Use 1 inch (25.4 mm) seam welds unless otherwise noted.
   5. Wires for Suspended Ceilings and Partition Bracing:
      a. Refer to architectural drawings for hanger wire attachment system to structure above.
      b. Do not use powder activated tool to attach fasteners for diagonal bracing wires.
   6. Deflection Allowance:
      a. Where partitions abut underside of concrete rigid construction, cut studs short and do not rigidly attach to runner track except at door jambs, corners, intersections, or where used for shaft walls.
      b. Where partitions abut concrete vertical surfaces, set end stud free of abutting surface and secure ends of horizontal stiffeners in partition to abutting surface.
   7. Cut Studs: If stud web is cut more than 50 percent or stud flange is cut to any degree, restore stud to original strength to the Architect's satisfaction by welding, screwing or wire-tying on steel reinforcement.
   8. Where galvanizing is removed by welding or other assembly procedures, clean area of any foreign matter by wire brushing and/or metal conditioner recommended by galvanized finish touch-up manufacturer. Apply galvanized touch-up coating by brush or spray with a minimum coverage of 1.5 mils (0.038 mm), dry-film.
   9. Where rust-inhibitive coating is removed by welding or other assembly procedures, clean area of any foreign matter and apply rust-inhibitive touch-up coating.

B. Stud Partition, Typical:
   1. Runner Track:
      a. Install sheet metal closures and zee clips where noted to receive runner track.
      b. Use same runner track type and stud type for partitions unless otherwise noted.
      c. Accurately align floor and ceiling runner track and securely attach at maximum 24 inches (609.6 mm) on center and at each end.
      d. Do not miter runner track at corners.

2. Studs:
   a. Space studs maximum 16 inches (406.4 mm) on center unless otherwise noted.
   b. Securely attach studs to runner track of load bearing partitions. Weld both flanges of stud to track where specifically noted.
   c. Locate studs maximum 2 inches (50.8 mm) from opening jambs abutting partitions or other construction.
   d. At partition corners, position stud to form outside corner and locate another stud within 2 inches (50.8 mm) from inside corner along each partition, unless otherwise noted.
3. Strap Horizontal Bracing and Bridging at Exterior Wall: Refer to architectural drawings for notes and details.
4. Partition Bridging: Stiffen partitions with 3/4 inch (19.1 mm) horizontally-placed channels not more than 60 inches (1 524 mm) apart vertically. Use 1-1/2 inch (38.1 mm) channels for unsupported height of 20 feet (6 096 mm). Wire-tie channels to inside of studs, or secure as recommended by stud manufacturer.
5. Completely frame openings.
6. Where partitions are unsupported laterally for 20 feet (6 096 mm) or more, use heavier gauge runner track at top of steel studs and secure by bridging and bracing to structure above.
7. Vertical framing at Openings 48 Inches (1 219 mm) Wide or Less:
   a. Refer to architectural drawings for framing notes.
   b. Weld, bolt, or screw jamb anchors to studs.
8. Vertical framing at Openings Greater than 48 Inches (1 219 mm):
   a. Refer to architectural drawings for framing notes.
   b. Weld, bolt, or screw jamb frame anchors to studs.
9. Vertical Framing at Lead-Lined Door and Window Frames:
   a. Refer to architectural drawings for framing notes.
10. Framing Over Openings:
    a. Refer to architectural drawings for framing notes. Weld, bolt, or screw jamb frame anchors to studs.
11. Install studs at glazed partitions as detailed.
12. Framing Around Duct Penetration Through Wall: Follow notes for vertical framing at openings and framing over openings noted above. Set stud framing to clear penetrations by approximately 1/4 inch (6.35 mm).

C. Furring:
   1. Install intermediate bracing at spaces sufficient to provide substantial foundation for collateral materials or other supported items.
   2. Secure furring channels vertically at 16 inch (406.4 mm) on centers.
   3. Completely frame openings with channel.

D. "Z" Furring Masonry or Concrete Walls:
   1. Install "Z" furring channels spaced 24 inches (609.6 mm) on centers.
   2. Follow manufacturer's installation specifications for fastenings and interior and exterior corner conditions.

E. Suspended Ceiling:
   1. Secure suspended ceiling to structural framing using hangers, 1-1/2 inch (38.1 mm) hot rolled carrying channels, and furring channels.
   2. Do not use Drop-In type expansion anchors for installing suspended ceiling.
   3. Hangers:
      a. For Gypsum Board Application: Space hangers maximum 4 feet (1 219 mm) on center along carrying channels spaced maximum 4 feet (1 219 mm) on center.
      b. For Metal Lath and Plaster Application: Space hangers maximum 4 feet (1 219 mm) on center along carrying channels spaced maximum 3 feet (915 mm) on center.
   4. Cross Furring Channels:
      a. For Gypsum Board Application: Attach furring channels to carrying channels at maximum 16 inches (406.4 mm) on center.
      b. For Metal Lath and Plaster Application (3.4 lbs./sq. yd.)(1.84 kilogram per square meter): Attach 3/4 inch (19.1 mm) cold rolled channel to carrying channels at maximum 16 inches (406.4 mm) on center. Saddle-tie furring channel to main runner with not less than No. 16 gage (1.6 mm) wire.
   5. Do not penetrate duct work with hangers.
   6. Provide additional carrying channels, etc. to clear interfering elements in furred area.
   7. Where main runners are spliced, ends shall be overlapped minimum 12 inches (304.8 mm) with flanges of channels interlocked and securely tied near each end of splice with wire looped twice around channel.
   8. Space ceiling wires at least 6 inches (152.4 mm) from unbraced ducts, pipes, and similar items.
   9. Provide hanger wires at intersections of grid members at corners of light fixtures.
   10. Completely frame openings with channels.
   11. Entire suspension system, including all intersections, splices, and perimeter joints, shall be capable of meeting seismic requirements of CCR Title 24, Section 2312(a) and (g).

F. Backing in Stud Partitions or Furring (See Backing Plate Schedule in drawings):
   1. Typical: Securely weld or screw cut sections of unpunched stud, flat plates, or bent plates to at least 3 studs or furring supports, leaving flat surface of backing stud web to receive attachment of object to be secured.
   2. Backing for Toilet and Bath Accessories and Equipment: As scheduled and noted.
   3. Verify that any predrilling of backing and attachment of spacers to prevent crushing of collateral material is done prior to application of collateral material.
   4. If it is determined by the Architect that backing was not provided for any items as required by Backing Plate Schedule in drawings, the Contractor shall remove the finish material and install the backing and shall patch and refinish the surface to match adjacent areas and surfaces at no additional cost to Trustees.

G. Employ the sprayed-fireproofing applicator to patch and repair any damage to sprayed-fireproofing caused by work of this Section.

3.03 FIELD QUALITY CONTROL

A. Testing of Expansion Anchors: Meet requirements of Metal Fabrication Section.

B. Testing of Pin and Clip Anchors for Vertical Suspension Wires, Expansion Eye Anchors and Expansion Anchors and Steel Straps for Hanging and Diagonal Bracing Wires: For verifying satisfactory installation workmanship, anchors will be proof-tested by the Trustees' Testing Laboratory in the presence of the Trustees' Project Inspector to required test loads scheduled below.
   1. Hanger Wire Test: 1 out of 10 anchors will be field tested for 200 pounds of tension.
   2. Diagonal Bracing Wire Test, Expansion Anchors: 1 out of 2 anchors will be field tested for 440 pounds (199.6 kg) in tension.
   3. Powder driven anchors are not permitted for diagonal bracing wire anchors.
   4. In the event of any test failure, test all anchors as directed by the Architect. Additional testing required because of test failure shall be paid for by the Contractor.
   5. Replace all unfair pins and anchors.

END OF SECTION

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SECTION 09 22 00: PORTLAND CEMENT PLASTER

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section:
1. Provision of Portland cement plaster work including plaster backing for other finishes.
2. Provision of cement plaster accessories.
3. Provision of grout behind metal edge and corner guards, metal frames and sills.

B. Related Sections:
1. See Section 09 23 00 METAL LATH for typical cement plaster screed, corner, control joints, and trim accessories.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
1. American Society for Testing and Materials (ASTM).

1.3 DEFINITION

A. Plaster Thickness: Minimum overall thickness measured from face of support (stud, furring, masonry, concrete) to face of finish coat. Thickness includes lath and applies to each face of hollow partitions.

1.4 SYSTEM DESCRIPTIONS

A. Design Requirements:
1. Plaster systems shall provide suitable base for finishes and trim scheduled for application over plaster work.
2. Exposed finish surfaces shall be true, even, without waves, cracks, or imperfections. Cracks, blisters, pits, or discoloration will not be acceptable.
3. Fire-rated plaster systems shall satisfy minimum fire ratings as noted.
4. Plaster work shall preserve continuity of fire ratings.

B. Regulatory Requirements: Fire-rated plaster systems shall meet requirements of the State Fire Marshal and local Building Inspector.

C. Allowable Tolerances: Surface tolerance shall be limited to 1/4 inch in 10 feet with maximum inward and maximum outward allowance not occurring in less than 20 feet.

1.5 SUBMITTALS

A. Product Data:
   1. Submit manufacturer's product data to accompany each manufactured item of which a sample is requested.

B. Samples:
   1. Stucco Finish: Submit before constructing job mock-up two 12 by 12 inch plaster panels, including all joint system and perimeter plaster accessories, for approval of color and texture.
   2. Other Samples only as requested.

C. Shop Drawings:
   1. Showing locations of all expansion and control joints in elevations or reflected ceiling plans and details of components and attachment.

1.6 QUALITY ASSURANCE

A. Reference Standards:
   1. ASTM C932-06: Standard Specification for Surface-Applied Binding Compounds for Exterior Plastering.
   2. ASTM C1063-07: Standard Specification for Installation of lathing and Furring to receive Interior and exterior Cement-Based Plaster.
   3. ASTM C932-06: Standard Specification for Application of Cement-Based Plaster.

B. Job Mock-Up:
   1. Prior to installation of lath and plaster, build at job site a mock-up, complete with back-up construction, for approval by the Trustees. Do not construct mock-up until Samples are approved.
   2. Mock-up panel shall be 4 feet wide by 8 feet high showing expansion and control joints.
   3. Mock-up must be approved before commencing lath and plaster work.
   4. Leave mock-up in place during installation of work.
   5. Remove mock-up from site when so directed by the Trustees.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

B. Keep plaster and other cementitious materials dry until ready for use. Keep materials off ground, under watertight covers, and away from seating walls and damp surfaces.

C. Remove from site any damaged or deteriorated materials.

1.8 PROJECT CONDITIONS

A. Environmental Requirements:
   1. Provide proper ventilation for curing plaster during and after application. Do not subject plaster to hot, dry winds.
   2. Maintain interior areas to receive plaster at uniform temperature of not less than 55 degrees Fahrenheit for at least 2 days before, during, and after plastering until plaster is cured. Do not install exterior plaster when ambient temperature is less than 32 degrees Fahrenheit.
   3. When temporary heat is used, take proper measures to insure that heat is evenly distributed. Prevent concentrated or uneven distribution of heat on plaster work near heat source.
   4. Maintain interior night-to-day temperature variation of less than 20 degrees Fahrenheit.

B. Protection: Protect adjacent surfaces from plastering operations.

PART 2 - PRODUCTS

2.1 PLASTER SYSTEMS

A. Portland Cement Stucco:
   1. Thickness: 3/4 inch (at metal lath and paper-backed lath; 5/8” at concrete or concrete masonry unit substrate).
   2. Typical Base Coats: Proportions in accordance with ASTM C926-06 with fibers.
   3. Waterproofed Finish Coat: Factory mix requiring addition of water only.
   4. Finish Treatment: Medium Sand-Texture finish. All cement plaster is to be finish painted. Final paint finish color to be selected by Trustees.

2.2 MATERIALS

A. Special Finishing Hydrated Lime: ASTM C206-03, Type S.

B. Portland Cement: Meeting requirements of ASTM C150-07, Type I. Use white cement for Portland cement stucco.

C. Stucco Finish Coat: Factory mixed waterproof finish requiring addition of water only and meeting requirements of ASTM C926-06.

D. Sand for Portland Cement Plaster: ASTM C897-05, uniformly graded from coarse to fine, passing a No. 4 sieve and all retained on a No. 100 sieve.

E. Fiber Reinforcement: Chopped strands of 1/2 inch alkaline resistant polypropylene fiber or glass fiber, free of contaminants, manufactured for use in portland cement plaster (scratch coat only). Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. ft. (16 kg of fiber/cu. m) of cementitious materials. Reduce aggregate quantities accordingly to maintain workability.

F. Water: Clean and potable, free from impurities detrimental to plaster.

2.3 MIXES

A. Mix in accordance with ASTM C926-06, unless otherwise noted.

B. Proportion materials for each plaster batch with measuring devices of known volume.

C. Size batches for complete use within maximum of 1 hour after mixing.

D. Retemper plaster stiffened from evaporation, but do not use or retemper partially hydrated cement plaster.

E. Do not use frozen, caked, or lumping materials. Remove such materials from job site immediately.

F. Mix factory prepared cement plaster in accordance with manufacturer's instructions.

G. Use moist, loose sand in mix proportions.

H. Withhold 10 percent of mixing water until mixing is almost complete, then add as needed to produce required consistency.

I. Prepare plaster in mechanical mixer to produce a mortar of workable consistency and uniform color. Do not hand mix unless approved by the Architect.

J. Clean mechanical mixer of set or hardened materials before loading for new batch.

K. Use waterproof mixing boxes and water barrels when mixing in building.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces scheduled to receive plaster and verify following:
   1. Proper alignment of support systems.
   2. Complete installation of blocking, bracing, and backing members in support systems.
   3. Complete installation of lath systems.

B. Do not start installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate details with other work supporting, adjoining, or fastening to plaster.

3.3 INSTALLATION

A. Grouting:
   1. Where formed metal edge and corner guards are secured directly to stud and lathing systems in plaster conditions, grout solidly with plaster from behind.
   2. Grout solidly behind steel frames and sills.

B. Plaster Application:
   1. Methods and workmanship for Portland cement stucco systems shall meet requirements of ASTM C926-16a.
   2. Apply stucco finish in strict accordance with approved manufacturer's directions.
   3. Brown coats shall be rodded and floated. No darbies permitted.
   4. Horizontal stage joinings within any wall surface or area will not be permitted. Schedule work to permit completion of entire area, bounded by natural breaking points, from top to bottom within 1 day period whether operation be scratch, brown, or finish coating.
   5. Where formed metal edge and corner guards are secured directly to stud and lathing systems in plaster conditions, fill solidly with plaster from behind.
   6. Score finish plaster at junction with metal frames.

C. Plaster Curing:
   1. Curing in accordance with Reference Standards and as follows:
      a. Keep Portland cement systems damp for at least 48 hours after application.
      b. Apply water in fine fog spray.
      c. Protect work from uneven and excessive evaporation during hot, dry weather and from strong blasts of wind.
      d. Damp cure scratch coats for minimum 3 days.
      e. Damp cure brown coats for minimum 14 days.
      f. Damp cure finish coat for minimum 7 days.
      g. Cure proprietary finish in accordance with manufacturer's instructions.

C. Defective Work: Correct conditions in violation of these specifications by removing to whatever extent correction requires and replace with acceptable work.

3.4 PATCHING AND CLEANING

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A. Patching:
   1. Upon completion, point-up plaster around trim and other locations where plaster meets dissimilar materials.
   2. Cut out and patch defective and damaged plaster.
   3. Cut out and patch stained or discolored finish plaster.

B. Cleaning:
   1. Remove plaster and protective materials from expansion beads, perimeter beads, and adjacent surfaces.
   2. Remove stains from plaster surfaces that would affect finishes.

END OF SECTION

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SECTION 09 23 00: METAL LATH & WRB

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section: Provision of metal lath, water resistant barrier, and related accessories.
B. Metal lath is to be self-furring unless otherwise noted in drawings or specifications.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
   1. Federal Specifications (Fed. Spec.).
   2. American Society for Testing and Materials (ASTM).
   3. Metal Lath/Steel Framing Association's "Specifications for Metal Lathing and Furring", 920, and "Metal Lath Technical Bulletins" (ML/SFA).
   4. State of California, California Code of Regulations, Title 24, (CCR Title 24).

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Lath and related accessories shall provide proper, secure base, and reinforcement for plaster systems.

1.4 SUBMITTALS

A. Product Data.

B. Samples: Only as requested.

C. Shop Drawings: Provide shop drawings for all control and expansion joint locations for the proposed first Residential Complex to be constructed and for the Community Center.

D. Mock-Up: See 1.5 QUALITY ASSURANCE below.

1.5 QUALITY ASSURANCE

A. Mock-Up
   1. Job Mock-Up:
      a. Prior to installation of the metal lath system, the Contractor shall construct at job site a mock-up of a portion of the building containing all necessary conditions for approval by the Trustees. See the drawings which indicate an area of exterior wall bounded by foundation, wall corner beads, and floor control joint that contains an exterior window.
      b. Mock-up will be inspected at the following milestones before proceeding:
         i. Foundation weep screed, fluid applied water resistant barrier, rigid insulation board, building paper, and typical window flashing installation.
         ii. Corner Beads, control joints, rainscreen drainage mat, and metal lath.

c. Mock-up must be approved before commencing metal lath work.
d. Leave mock-up in place during installation of metal lath work.
e. Protect mock-up against weather and defacement.
f. Remove mock-up from site when so directed by the Trustees (unless mock-up is to incorporated into the work).

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

B. Protect metal products from rusting.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Metal Lath: Galvanized finish at Portland cement plaster (complying with ASTM C 847 with ASTM A653-07, G60).
1. Type SF, Self-Furring Base (typical unless otherwise noted): Same as Type F Flat Base lath except with indentations approximately 1/4 inch (6.35 mm) deep spaced approximately 6 inches (152.4 mm) each direction.
2. Type FR, Flat Rib Lath: Expanded copper-bearing steel weighing 3.4 pounds per square yard (1.84 kilogram per square meter) with 1/8 inch (3.18 mm) deep ribs.
3. Type F3/8R, 3/8 Inch (9.53 mm) Rib Lath (to be used at exterior suspended cement plaster soffit/ceilings typ): Expanded copper-bearing steel weighing 3.4 pounds per square yard (1.84 kilogram per square meter) with 3/8 inch (9.53 mm) deep ribs.

B. Building Paper: Vapor permeable water-resistive barrier with 1-ply asphalt saturated kraft Grade D breather type sheathing paper applied in one layer having a UL flame spread rating of 25 or less (Class A) and meeting requirements of Fed Spec UU-B-790a, Type 1, Grade D, Style 2; and ASTM F 1249 and D779. Note drawings indicate “two layers” at cement plaster, but 60 Minute product specified satisfies this requirement in one layer. -
1. Product (at Cement Plaster): ”Fortifiber’s “Super Jumbo Tex 60 Minute”; or approved equal.
2. Product (at Wood Siding): ”Fortifiber’s “Jumbo Tex”; or approved equal.

C. Attachments and Fastenings:
1. Tie Wire: Fed. Spec. QQ-W-461H, Finish 5, Class 1 soft temper; minimum 18 gauge (1.5 mm).
2. Screws: Galvanized, self-drilling, and self-tapping, as recommended by approved applicator.
3. Meet requirements of CCR Title 24, Part 2, Sections 4705 and 4706.

D. Typical Accessories:

1. Foundation Weep Screeds:
a. Product: (custom fabricated to profiles shown in the contract documents from minimum 24-gauge galvanized sheet steel with perforations on the lower leg for weeping); or approved equal.
2. Control Joints:
a. Product: Phillips Manufacturing Co’s “#15 Double V Expansion Joint”; or approved equal.

3. Corner Beads:
   a. Product: Phillips Manufacturing Co's "#1 Expanded Corner Bead"; or approved equal.
4. Expansion Joints:
   a. Product: Phillips Manufacturing Co's "#40 Expansion Joint"; or approved equal.
5. Strip Reinforcement: Similar to Type F metal lath, minimum 6 inches (152.4 mm) wide.
6. Exterior Accessories: Provide items integral with stucco application including, but not necessarily limited to, stucco drip caps, stucco casing beads, fluted stucco casing beads, and stucco reveals:
   a. Material: 24-gauge min galvanized sheet steel (custom fabricated to profiles shown in the contract documents).
   b. Fabrication: Items of standard manufacture may be furnished in lieu of specially-fabricated items provided such items conform to requirements shown or noted. Runs shall be continuous between joint intersections designed to permit movement. Provide plain, perforated, or expanded flanges as noted.
7. Corner Reinforcement (Exterior Work): Woven galvanized copper-bearing steel wire, minimum 18 gauge.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces scheduled to receive lath and accessories and verify following:
   1. Proper alignment of support systems.
   2. Complete installation of blocking, bracing, and backing members in support systems.

B. Do not start installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate details with other work supporting, adjoining, or fastening to lath.

3.3 INSTALLATION

A. General Requirements: Install lath and related accessories straight, plumb, or level as required, to provide appropriate thickness of plaster.

B. Metal Lath Application:
   1. Install in accordance with ASTM C1063-07 Standard Specification for Installation of Lathing and Furring to Receive Interior and Exterior Cement-based Plaster and ML/SFA unless otherwise noted.
   2. Apply metal lath with the long dimension at right angle to supports. Stagger ends of lath to avoid continuous joint on same support.
   3. Lap all joints at least one mesh. Lap building paper to building paper and metal lath to metal lath.
   4. Furr out metal lath 1/4 inch (6.35 mm) over solid backing by self-furring lath or by special furring nails.
   5. Hang lath at openings with cut-out to include at least 1 and possibly 2 opening corners (same as panel of gypsum board might be cut out to include entire opening). Horizontal joints in line with head or vertical joints in line with jamb will not be permitted.

6. At vertical cement plaster conditions on studs or on furring, or over gypsum sheathing, use metal lath over building paper.
7. Where metal lath occurs over gypsum sheathing, screw-attach metal lath to studs, not to gypsum sheathing.
8. Apply corner beads at all exterior plaster corners using single lengths without joints. Joints allowed at horizontal control joint intersections only.
9. Install casing beads at terminations of all plaster surfaces unless otherwise shown.
10. Use screeds to adjust plaster thickness or between plaster types.
11. Install control and expansion joints in plaster work at maximum 16 foot centers; verify all expansion joint locations with ML/SFA requirements.
12. Exterior Accessories:
    a. Install continuous runs except where joint intersections are permitted. In joining straight runs, lap joint sufficiently to maintain alignment while permitting movement.
    b. Solder joints where required. Solder beads shall be neat and free from extraneous flux. Do not solder lap joints.

C. Defective Work: Correct conditions in violation of these specifications by removing to whatever extent correction requires and replace with acceptable work.

END OF SECTION

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SECTION 09 29 00: GYPSUM WALLBOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section:
   1. Provision of gypsum sheathing surfaces, backing for other finishes, joint treatment for gypsum sheathing, and accessory items.
   2. Provision of standard catalog products, related accessories, and fasteners.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
   1. American Society for Testing and Materials (ASTM).
   2. Gypsum Association's "Levels of Gypsum Board Finish" (GA-214-07).
   3. Gypsum Association's Recommended Specification for Application and Finishing of Gypsum Board (GA-216-07).

1.3 SYSTEM DESCRIPTION

A. Design Requirements: Fire-rated gypsum wallboard systems shall satisfy minimum fire ratings as noted.

1.4 SUBMITTALS

A. Product Data.

B. Samples: Provide 12 inch by 12 inch sample of proposed gypsum wallboard finish as specified in 09 29 00 3.4 for review and approval of Trustees.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Fire-rated gypsum wallboard systems shall meet requirements of the State Fire Marshal.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in original packages, containers or bundles, bearing brand name and name of manufacturer or supplier for whom product is manufactured.

B. Keep materials dry, preferably by storing inside building or under roof. Where necessary to store gypsum board outside, stack off ground on properly supported level platform, and fully protect from weather.

C. Stack gypsum board neatly and flat, with care to avoid damage to edges, ends, and surfaces.

1.7 PROJECT CONDITIONS

A. Environmental Requirements: Maintain areas to receive gypsum board at uniform temperature between 55 and 75 degrees Fahrenheit (285.93 and 297.04K) during gypsum board application and joint finishing. Provide adequate ventilation to eliminate excessive moisture within building during this period.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Exterior Gypsum Sheathing:
   1. Gypsum Sheathing Board - Note this would apply to all gypsum board layers within partition assemblies (fire-rated and non-rated) unless otherwise noted or required to be Acoustical or Water-Resistant:
      a. Description: ASTM C1396, Type X, square edge; 5/8 (15.88 mm) inch thickness unless otherwise noted; 48 inches (1 219 mm) wide by maximum length to minimize number of joints.
      b. Product: Georgia-Pacific's "DensGlass Fireguard Sheathing"; or approved equal.

B. Screws: ASTM C1002-07, self-drilling and self-tapping steel screws with double-lead thread design as approved by system manufacturer for standard and heavier gauge load bearing steel framing.

C. Metal Accessories: Electro-galvanized steel corner beads and trim (casing beads) formed for application of joint cement and manufactured specifically for gypsum wallboard construction.

D. Joint Reinforcing Tape and Cement: ASTM C475-02 (2007). Use glass-fiber open-weave tape, Type P for concrete core backer board.

E. Adhesive for Laminating Board: Contact cement as recommended by approved board manufacturer.

F. Acoustical Caulking:
   1. Description: Permanently resilient, latex based, nonstaining type of density equal to or greater than gypsum board, suitable for use in fire-rated and acoustical partitions.
   2. Product: USG's USG Sheetrock Brand Acoustical Sealant"; or approved equal.

G. Resilient Channel: Formed from minimum 26 gauge galvanized steel sheet; 1 flange perforated for attachment.

2.2 STANDARD CATALOG PRODUCTS

A. (none)

Cal Poly Humboldt
Library Flat Roof Replacement

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and surfaces scheduled to receive gypsum board and verify that:
   1. Support systems are in proper alignment.
   2. Blocking, bracing, and backing members of support systems are installed.

B. Do not start installation until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate details with other work supporting, adjoining, or fastening to gypsum board.

3.3 INSTALLATION

A. General Requirements:
   1. Apply and finish gypsum board in accordance with requirements of ASTM C840-07 and manufacturer's recommendations unless otherwise noted.
   2. Cut gypsum board by scoring and breaking or sawing from face side. Smooth cut edges and ends of gypsum board as necessary in order to obtain neat jointing.
   3. When gypsum board is applied to both ceiling and walls, apply the gypsum board first to ceiling and then to walls.
   4. Scribe ceiling board neatly in casing bead where it meets surfaces of different materials in other planes.
   5. Apply in either vertical or horizontal direction with ends and edges falling on studs, except where edge joints are at right angles to stud. Gypsum wallboard shall be of length required to reach full height of vertical surfaces in 1 continuous piece. Bring ends and edges into contact with adjoining board.
   6. Maximum allowable gap at end joints: 1/4 inch.
   7. Lay out joints at openings so that no end joint aligns with edges of opening. Stagger end joints and arrange joints on opposite sides of partition to occur on different studs. At external corners, butt and fit base to provide solid edge. At end joints between framing members, taper and back-block or apply metal-backed tape.
   8. Hold gypsum board nominal 1/4 inch above floor or curb unless otherwise noted.
   9. Where gypsum board is carried full height from floor to underside of overhead structure system, provide for deflection of structure by undercutting board nominal 3/8 inch. Caulk top edge of board to structure in continuous bead to form elastic closure where specifically noted.
   10. Cut board to fit electrical outlets, pipes or other items as required. Cut gypsum board by scoring on face and back in outline before removal or by cutting with a saw or other suitable tool. Smooth all cut outs where necessary.
   11. Provide gypsum backer board gusset at double stud walls where studs are less than 3-5/8 inches thick.

12. Fastening: Application of fasteners shall proceed from center or field to edges and ends, pressing firmly against supports. Space fasteners when used at edges or ends, not more than 1 inch from edges and not less than 3/8 inch from edges and ends of gypsum board. Fasteners shall be slightly below surface, without breaking the surface paper of gypsum wallboard or stripping the framing member around the screw shank. Perimeter fastening into the partition plate or sole at the top and bottom is not required except where fire ratings or structural performance require such fastening.
    a. Gypsum Wallboard, Ceiling Application: Space screws maximum 12 inch on centers.
    b. Gypsum Wallboard, Wall Application, Single Ply: Space screws maximum 8 inch on centers around perimeter and 12 inch on centers on intermediate studs.
    c. Gypsum Wallboard, Wall Application, Base Ply (Two Ply Application): Space screws maximum 8 inch on centers around the perimeter and 12 inch on centers on the intermediate studs.
    d. Gypsum Wallboard, Wall Application, Face Ply (Two Ply Application): Space screws maximum 9 inch on centers along vertical joints, 12 inch on centers at intermediate studs and 24 inches on center along top and bottom runners.
    e. Concrete Core Backer Board: Space screws maximum 8 inches on center in field and along abutting edges.
    f. "Z" Furring Channels: Apply gypsum panels parallel to channels with vertical joints occurring over channels and screw in place at 16 inches centers in field of panels and at edges and 12 inches centers at exterior corners.
13. Accessories:
    a. Install corner beads at external angles where edge or corner guards are not designated.
    b. Install metal trim at exposed edges of gypsum board and at intersections with other surfaces.
    c. Set accessories tight against base and firmly secure at 12 inch maximum intervals.
    d. Install control joints per ASTM C 840 and GA 216.
    e. Correct surface damage and defects after trim is applied.

C. Flexible Trim:
    1. Install flexible trim where shown in accordance with manufacturer's instructions.
    2. Screw through holes provided at spacing recommended by manufacturer to metal supports or backing plates, not to gypsum board substrate.

D. Joint Treatment:
    1. Apply field joints and corners in accordance with directions of gypsum board manufacturer.
    2. Use tape and cement, minimum 3 coats; allow to dry between coats.
    3. Work final coat to smooth level plane surface.
    4. Protect external corners with metal corner beads unless otherwise noted.
    5. Treat fastening head dimples same as joints; tape may be omitted.

E. Fire-Rated Conditions:
    1. Preserve continuity of fire rating.
    2. Provide fire-rated enclosures for electrical outlets and junction boxes, recessed cabinets, recessed light fixtures, and other items of any nature.
    3. Where adjacent interior spaces have suspended ceilings of different heights, extend separating partition finish on both faces of studs to at least 3 inches above higher ceiling finish.
    4. Meet requirements of applicable codes and authorities for taping and cementing joints and fastener heads.

F. Sound-Rated Partitions:
   1. Construct partitions in accordance with drawings and as herein specified.
   2. Hold face layers and base layers 1/4 inch clear from abutting surfaces (floors, walls, and ceilings). Seal with acoustical caulking and tape. Tape not required at floors.
   3. Provide airtight closures at wall penetrations (outlet boxes, pipes, ductwork, and other items) by neatly cutting gypsum board to clear penetrations by approximately 1/4 inch. Seal void with acoustical caulking and apply joint tape to both gypsum board and penetrating object.
   4. Provide acoustical putty pads at all electrical boxes. Sequence structural sheathing and finish gypsum board to allow access to the back of all boxes requiring putty pads.

G. Water-Resistant Board: Reseal edges of board cut on job site before erecting board.

H. Shaft Enclosures: Follow approved system manufacturer's directions using metal components, deflection angles, gypsum components, and other accessories as required.

I. Fire ratings and acoustical performance may require gypsum board of greater thickness.

J. Backer board may be used as base board when acoustical tile or additional layers of gypsum board are applied over it.

3.4 GYPSUM WALLBOARD FINISH

A. Typical Interior Wall and Ceiling Finish: Gypsum Association (GA-214-07) Level 5 Finish typical at areas to receive eggshell or semi-gloss paint finishes (Level 4 at areas to receive flat paint finish and Level 2 finish at areas to receive tile). Provide 12” x 12” minimum sample for approval by Trustees. See submittal requirements.

3.5 CLEANING AND ADJUSTING

A. Remedy evidence of fastener popping or ridging.

END OF SECTION

SECTION 09 91 00: PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included in this Section: Provision of painting and preparation of surfaces unless otherwise noted.
   1. Work includes, but is not limited to, painting of following items, materials, and spaces:
      a. All exterior exposed surfaces of new or remodeled work as part of the scope of work for the Library Flat Roof Replacement.
      b. All interior exposed surfaces disturbed as part of the scope of work for the Library Flat Roof Replacement. Exterior and interior surfaces disturbed as required by repair, patching, and/or retrofitting of fixtures should be fully painted to the nearest wall/ceiling plane change.
      c. Exposed mechanical and electrical items such as piping, conduit, ductwork, panelboards, grilles, and other similar items including their supports except items noted as factory-finished.
      d. Wall and ceiling diffusers/registers (not within suspended act ceilings), wall and ceiling speakers, flush mounted electrical panelboards and cabinets, and television brackets. Field paint to match adjacent surfaces.
      e. Semi-visible areas behind registers, grilles, diffusers, screen vents, etc.
      f. Vision panel frames in wood doors even if they are factory finished.
      g. Hardwood paneling and trim on architectural woodwork and custom plastic laminate casework.
   2. Work does not include painting following items, materials or spaces:
      a. Surfaces noted to receive "Special Coating Section 09 67 23" (if section is included in this Project Manual).
      b. Mechanical and elevator shafts.
      c. Concrete traffic decks, steps, and ramps (see notes on drawings for powerwashing).
      d. Mechanically-finished nonferrous metals such as stainless steel, and bronze, except soft annealed stainless steel, copper, and exposed mechanical and electrical items.
      e. Factory-finished equipment and materials such as resilient floor, acoustical materials, plastic laminate casework, etc.
      f. Interior spaces specifically noted as unpainted.

B. Definition of Factory Finish: Factory-applied painting system consisting of primer and finish coats equal in quality to gloss enamel system specified for ferrous metal under work of this Section.

1.2 INCORPORATED DOCUMENTS

A. Published specifications, standards, tests, or recommended methods of trade, industry, or governmental organizations apply to work of this Section where cited by abbreviations noted below.
   1. Federal Specifications (Fed. Spec.).
   2. Society for Protective Coatings (SSPC) SSPC Standards (Latest Revision)
   3. American Society for Testing and Materials (ASTM) (Latest Revision)

1.3 QUALITY ASSURANCE

A. Job Mock-Up:
   1. If directed by the Trustees, apply where designated 3 foot square samples of each or any color

selected for final approval.
2. Apply specified finish to architectural woodwork Sample and concrete Sample for approval prior to commencing work.

B. Regulatory Requirements: All painting material used shall be in compliance with Volatile Organic Compound (VOC) environmental regulations for location of Project.

1.4 SUBMITTALS

A. Product Data. Reference data to the Painting System Schedule (see section 3.6). Include manufacturer's statement that components are appropriate to each painting system.

B. Samples: 8-1/2 by 11 inch card of each color for approval prior to commencing work. Samples shall be for color approval only, not texture or finish. Submit in sufficient time to avoid delaying progress of work.

C. Upon the Architect's request, furnish copies of invoice with quantities of materials purchased for Project.

D. Extra Stock: Provide five-gallon container of each color used. Label each container with color, texture and room locations, in addition to the manufacturer’s label.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use.

B. Store and mix all materials in ventilated areas as directed. Remove all empty containers, waste, and rags from premises overnight.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:
1. Temperature: Do not apply paint to interior or exterior surfaces when ambient temperature is less than 50 degrees Fahrenheit.
2. Apply paint under dry and dust-free conditions.

B. Illumination: Perform work under adequate and approved lighting conditions.

C. Protection: Properly protect floors and other adjacent work by drop cloths or approved coverings during painting operations.

D. Cleaning Painters Tools and Equipment: Do not clean tools and equipment within occupied buildings or near outside air intakes.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Acceptable Manufacturers: PPG Paints, makers of Glidden Professional; Watco-Dennis Corp.; Olympic Stain Co.; Sika Corporation U.S.; or approved equal. Manufacturer's catalog numbers listed in Painting System Schedules indicate type and quality desired.

B. Colors:
   1. Interior Colors: 25 percent shall be as dark or darker than Glidden Paints' Afternoon Tea 80YR21/226. Additional coat and use of special paints may be required to achieve color designated (assume minimum 4 wall colors)
   2. Color of ceilings will be different from walls (assume minimum 3 ceiling colors).
   3. Colors of door and steel/aluminum metal frames will be different from walls (assume minimum 3 door/frame colors).
   4. Exterior Colors: Range as selected by the Trustees (assume minimum 5 exterior colors).

C. Undercoats: Manufacturer shall be same as for finish coat wherever possible.

2.2 MIXING

A. Color-tint sealers and undercoats to correspond with finish color. Vary color of successive coats sufficiently to distinguish between coats.

B. Obtain the Trustees' approval for adjustments of color on job.

C. Do not reduce any material unless so directed by the Trustees, or unless recommended by materials manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine receiving areas and verify following:
   1. That moisture content of concrete and plaster does not exceed 14 percent prior to application.
   2. That moisture content of wood surfaces does not exceed 15 percent at time of painting.
   3. That receiving surfaces are thoroughly dry, clean and in proper condition to assure adhesion and proper functioning of coating specified. Application of prime coat will be considered acceptance of and responsibility for receiving surface.
   4. Prior removal of finish hardware, electrical switch plates and outlet covers, escutcheon plates, grilles, and other similar items where occurring on receiving surfaces.

3.2 PREPARATION

A. Cement Plaster and Concrete:

   1. Patching Existing Concrete Cracks and Spalls:
      a. Treat all exposed re-bar with Sika Armatek 110 EpoCem; or approved equal.
      b. Patch and/or repair all existing concrete spalls and cracks to be painted with Sika SikaRepair 223; or approved equal.

   2. Patching Existing Cement Plaster Cracks:
      a. Chip away all soft, loose and deteriorated materials.
      b. Clean cavity completely.
      c. Patch and/or repair all existing cement plaster cracks to be painted with Sika SikaSet Mortar; or approved equal.
      d. All patched areas are to be tooled/finished with a similar finish texture as the surrounding existing cement plaster finish. This will require feathering out new finish across a larger area that the specific area of repair.

3. Alkali Conditions: Test paint-receiving surfaces for presence of alkali; if present, neutralize as follows:
   a. After drying, remove precipitate by brushing.
   b. Wash surfaces to receive oil base paint with zinc sulphate solution containing 2-1/2 to 3 pounds of zinc sulphate per gallon of water.
   c. Wash surfaces to receive latex base paint using 4 percent solution of tetrapotassium-pyrophosphate and water.
   d. Proprietary neutralizing compounds as recommended by approved paint manufacturer will be acceptable.

B. Metal Work:
   1. Shop-Primed Metal: Retouch abraded surfaces using same type of paint as primer.
   2. Ferrous Metal: Clean surfaces using suitable solvents, tools and methods as required to achieve SSPC-SP1.
   3. Galvanized Metal:
      a. Clean surfaces using suitable solvents, tools and methods as required to achieve SSPC-SP1.
      b. SSPC-SP16 to remove all passivators, especially chromates. Apply a test patch and let cure for one week. Test adhesion to galvanized surface with ASTM D3359 tape Adhesion.

   4. Aluminum:
      a. Clean surfaces using suitable solvents, tools and methods as required to achieve SSPC-SP1.
      b. SSPC-SP16 to remove all passivators, especially chromates. Apply a test patch and let cure for one week. Test adhesion to galvanized surface with ASTM D3359 tape Adhesion.

   5. Soft Annealed Stainless Steel: Apply solvent to remove grease, oil, and dirt, and wash with proprietary chemical etching compound.

C. Wood:
   1. Cleaning: Remove dirt, dust, and mortar stains by brushing, scraping, or sanding; remove oil and grease with mineral spirits.
   2. Pitch and Sap Pockets: Scrape and wash with mineral spirits; seal knots and pitch streaks with shellac or knot sealer.
   3. Sand all wood and brush clean.

D. Previously Painted Surfaces: Clean and prepare surfaces in accordance with paint manufacturer's recommendations.

3.3 APPLICATION

A. General Requirements:
   1. Work in accordance with approved manufacturers' specifications and directions unless otherwise noted.
   2. Paint to sharp, true lines and edges; when color change occurs in same plane, paint to chalk lines or tape.
   3. Assure completed work is uniform.
   4. Dry Film Thickness: 1 to 1-1/2 mils per coat, unless otherwise noted, when measured by Elcometer over steel or Tooke Gauge over nonferrous metal.
   5. Coverage:
      a. Notwithstanding achievement of complete coverage with less than number of coats specified, apply specified number of coats.
      b. Where application of number of coats specified fails to achieve complete coverage, apply

additional coats as necessary.

B. Semi-Gloss or Eggshell Enamel Finishes on Walls and Ceilings: Brush on and promptly stipple roll to produce definite orange peel texture.

C. Factory-Primed Metal Items: Field-applied prime coats may be confined to abraded areas requiring touch-up.

D. Mechanical Diffusers and Grilles: Spray-on paint unless otherwise noted in drawings.

3.4 FIELD QUALITY CONTROL

A. Arrange for inspections by manufacturer's representatives to ensure correct use and application of products.

3.5 CLEANING

A. Upon completion of work, remove surplus materials and rubbish, and clean off spilled or splattered paint resulting from this Work.

B. Washing Finished Surfaces:
1. Wash in accordance with manufacturer's directions only where required to clean work.
2. Assure washing does not produce surface different from unwashed surface. Difference will be considered unsatisfactory work.

3.6 PAINTING SYSTEM SCHEDULES
(Note not all systems are necessarily required by project conditions)

A. Interior Systems:
1. Gypsum Wallboard - Typical Walls, Stipple Eggshell Finish:
   a. One Coat: PPG Paints 6-4900 Speedhide Zero Prime
   b. Two Coats: PPG Paints 6-4310XL Speedhide Zero Eggshell Finish

2. Gypsum Wallboard - Typical Ceilings, Stipple Flat Finish:
   a. One Coat: PPG Paints 6-4900 Speedhide Zero Prime
   b. Two Coats: PPG Paints 6-4110XL Speedhide Zero Flat Finish

B. Exterior Systems:
1. Concrete / Cementitous Plaster - Typical Exterior Acrylic Masonry Paint Flat Finish:
   a. One Coat Concrete and Masonry Primer: PPG 6001 Hydrosealer
   b. Two Coats: PPG Fortis 450 Exterior Paint 100% Acrylic Resin Flat Finish

2. Concrete (noted for Sealer/Enhancer)- Typical Exterior Water-Based Concrete Sealer Matte Finish:
   a. Two Coats: Prosoco’s StandOff Color Enhancer WB Water-Based Matte Finish

3. Concrete (at areas of applied structural carbon fiber wrap coating)- Typical Exterior Thixotropic One-Part, Plasto-Elastic Coating, Matte Finish:
   b. Two Coats: Sika’s Sikagard – 550 W Elastocolor (custom tinted to match adjacent typical wall color)

4. Ferrous Metal, Shop-Primed or Prepainted – Typical Finish Acrylic Semi-Gloss Enamel Finish:
   a. Primer: PPG Devoe Coating's 4020PF Devflex Water-bourne Acrylic Primer
   b. Two Coats: PPG Devoe Coating's 4216HP Devflex Water-bourne Acrylic Semi-Gloss Finish

5. Galvanized Metal – Typical Finish Acrylic Semi-Gloss Enamel Finish:
   a. Primer: PPG Devoe Coating's 4020PF Devflex Water-bourne Acrylic Primer
   b. Two Coats: PPG Devoe Coating's 4216HP Devflex Water-bourne Acrylic Semi-Gloss Finish

6. Aluminum - Typical Acrylic Semi-Gloss Trim Enamel Finish:
   a. Primer: PPG Devoe Coating's 4020PF Devflex Water-bourne Acrylic Primer
   b. Two Coats: PPG Devoe Coating's 4216HP Devflex Water-bourne Acrylic Semi-Gloss Finish

7. Zinc Alloy - Sheet Metal, Acrylic Semi-Gloss Trim Enamel Finish:
   a. Primer: PPG Devoe Coating's 4020PF Devflex Water-bourne Acrylic Primer
   b. Two Coats: PPG Devoe Coating's 4216HP Devflex Water-bourne Acrylic Semi-Gloss Finish

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 22 00 00 - PLUMBING BASIC REQUIREMENTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Work included in 22 00 00, Plumbing Basic Requirements applies to Division 22, Plumbing work to provide materials, labor, tools, permits, incidentals, and other services to provide and make ready for Owner's use of plumbing systems for proposed project.

B. Contract Documents include, but are not limited to, Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Drawings, Addenda, Owner/Architect Agreement, and Owner/Contractor Agreement. Confirm requirements before commencement of work.

C. Definitions:

1. Provide: To furnish and install, complete and ready for intended use.

2. Furnish: Supply and deliver to project site, ready for unpacking, assembly and installation.

3. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at project site as required to complete items of work furnished.

4. Approved or Approved Equivalent: To possess the same performance qualities and characteristics and fulfill the utilitarian function without any decrease in quality, durability or longevity. For equipment/products defined by the Contractor as "equivalent", substitution requests must be submitted to Engineer for consideration, in accordance with Division 01, General Requirements, and approved by the Engineer prior to submitting bids for substituted items.

5. Authority Having Jurisdiction (AHJ): Indicates reviewing authorities, including local fire marshal, Owner's insurance underwriter, Owner's Authorized Representative, and other reviewing entity whose approval is required to obtain systems acceptance.

1.2 RELATED SECTIONS

A. Contents of Section applies to Division 22, Plumbing Contract Documents.

B. Related Work:

1. Additional conditions apply to this Division including, but not limited to:

a. Specifications including Division 00, Procurement and Contracting Requirements and Division 01, General Requirements.

b. Drawings

c. Addenda

d. Owner/Architect Agreement

e. Owner/Contractor Agreement

f. Codes, Standards, Public Ordinances and Permits

1.3 REFERENCES AND STANDARDS

A. References and Standards per Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, individual Division 22, Plumbing Sections and those listed in this Section.

B. Codes to include latest adopted editions, including current amendments, supplements and local jurisdiction requirements in effect as of the date of the Contract Documents, of/from:

1. State of California:

a. CBC - California Building Code

b. CEC - California Electrical Code

c. CEC T24 - California Energy Code Title 24

d. CFC - California Fire Code

e. CMC - California Mechanical Code

f. CPC - California Plumbing Code

g. CSFM - California State Fire Marshal

h. DSA - Division of State Architect Regulations and Requirements

C. Reference standards and guidelines include but are not limited to the latest adopted editions from:

1. ABA - Architectural Barriers Act

2. ADA - Americans with Disabilities Act

3. AHRI - Air-Conditioning Heating & Refrigeration Institute

4. ANSI - American National Standards Institute

5. ASCE - American Society of Civil Engineers

6. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers

7. ASHRAE Guideline 0, the Commissioning Process

8. ASME - American Society of Mechanical Engineers
9. ASPE - American Society of Plumbing Engineers
10. ASSE - American Society of Sanitary Engineering
11. ASTM - ASTM International
12. AWWA - American Water Works Association
13. CFR - Code of Federal Regulations
14. CGA - Compressed Gas Association
15. CISPI - Cast Iron Soil Pipe Institute
16. ETL - Electrical Testing Laboratories
17. EPA - Environmental Protection Agency
18. FM - FM Global
19. IAPMO - International Association of Plumbing and Mechanical Officials
20. GAMA - Gas Appliance Manufacturers Association
21. HI - Hydraulic Institute Standards
22. ISO - International Organization for Standardization
23. MSS - Manufacturers Standardization Society
24. NEC - National Electric Code
25. NEMA - National Electrical Manufacturers Association
26. NFGC - National Fuel Gas Code
27. NFPA - National Fire Protection Association
28. NRCA - National Roofing Contractors Association
29. NSF - National Sanitation Foundation
30. OSHA - Occupational Safety and Health Administration
31. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association, Inc.
32. TEMA - Tubular Exchanger Manufacturers Association
33. TIMA - Thermal Insulation Manufacturers Association

34. UL - Underwriters Laboratories Inc.

D. See Division 22, Plumbing individual Sections for additional references.

1.4 SUBMITTALS

A. See Division 01, General Requirements for Submittal Procedures as well as specific individual Division 22, Plumbing Sections.

B. Provide drawings in format and software release equal to the design documents. Drawings to be the same sheet size and scale as the Contract Documents.

C. In addition:

1. "No Exception Taken" constitutes that review is for general conformance with the design concept expressed in the Contract Documents for the limited purpose of checking for conformance with information given. Any action is subject to the requirements of the Contract Documents. Contractor is responsible for the dimensions and quantity and will confirm and correlate at the job site, fabrication processes and techniques of construction, coordination of the work with that of all other trades, and the satisfactory performance of the work.

2. Provide product submittals and shop drawings in electronic format only. Electronic format must be submitted via zip file via e-mail. For electronic format, provide one file per division containing one bookmarked PDF file with each bookmark corresponding to each Specification Section. Arrange bookmarks in ascending order of Specification Section number. Individual submittals sent piecemeal in a per Specification Section method will be returned without review or comment. All transmissions/submissions to be submitted to Architect. At Contractor’s option, two separate submittals may be provided, consisting of underground work and building work. Deviations will be returned without review.

3. Product Data: Provide Manufacturer's descriptive literature for products specified in Division 22, Plumbing Sections.

4. Identify/mark each submittal in detail. Note what differences, if any, exist between the submitted item and the specified item. Failure to identify the differences will be considered cause for disapproval. If differences are not identified and/or not discovered during the submittal review process, Contractor remains responsible for providing equipment and materials that meet the Specifications and Drawings.

a. Label submittal to match numbering/references as shown in Contract Documents and schedules. Highlight and label applicable information to individual equipment or cross out/remove extraneous data not applicable to submitted model. Clearly note options and accessories to be provided, including field installed items. Highlight connections by/to other trades.

b. Include technical data, installation instructions and dimensioned drawings for products, fixtures, equipment and devices installed, furnished or provided. Reference Division 22, Plumbing Sections for specific items required in product data

submittal outside of these requirements.

c. Provide pump curves, operation characteristics, capacities, ambient noise criteria, etc. for equipment.

d. For vibration isolation of equipment, list make and model selected with operating load and deflection. Indicate frame type where required. Submit manufacturer's product data.

e. See Division 22, Plumbing Sections for additional submittal requirements outside of these requirements.

5. Maximum of two reviews of complete submittal package. Arrange for additional reviews and/or early review of long-lead items; Bear costs of additional reviews at Engineer's hourly rates. Incomplete submittal packages/submittals will be returned to contractor without review.

6. Resubmission Requirements: Make corrections or changes in submittals as required, and in consideration of Engineer’s comments. Identify Engineer’s comments and provide an individual response to each of the Engineer’s comments. Cloud changes in the submittals and further identify changes which are in response to Engineer’s comments.

7. Structural/Seismic: Provide weights, dimensions, mounting requirements and like information required for mounting, seismic bracing, and support. Indicate manufacturer's installation and support requirements to meet ASCE 7-16 requirements for non-structural components. Provide engineered seismic drawings and equipment seismic certification. Equipment Importance Factor as specified in Division 01 and in Structural documents.

8. Trade Coordination: Include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and connections as required per Division 22, Plumbing Coordination Documents. For equipment with electrical connections, furnish copy of approved submittal for inclusion in Division 26, Electrical submittals.

9. Make provisions for openings in building for admittance of equipment prior to start of construction or ordering of equipment.

10. Substitutions and Variation from Basis of Design:

    a. The Basis of Design designated product establishes the qualities and characteristics for the evaluation of any comparable products by other listed acceptable manufacturers if included in this Specification or included in an approved Substitution Request as judged by the Design Professional.

    b. If substitutions and/or equivalent equipment/products are being proposed, it is the responsibility of parties concerned, involved in, and furnishing the substitute and/or equivalent equipment to verify and compare the characteristics and requirements of that furnished to that specified and/or shown. If greater capacity and/or more materials and/or more labor is required for the rough-in, circuitry or connections than for the item specified and provided for, then provide compensation for additional

charges required for the proper rough-in, circuitry and connections for the equipment being furnished. No additional charges above the Base Bid, including resulting charges for work performed under other Divisions, will be allowed for such revisions. Coordinate with the requirements of "Submittals". For any product marked "or approved equivalent", a substitution request must be submitted to Engineer for approval prior to purchase, delivery or installation.

11. Shop Drawings: Provide coordinated Shop Drawings which include physical characteristics of all systems, equipment and piping layout plans, and control wiring diagrams. Reference individual Division 22, Plumbing Sections for additional requirements for Shop Drawings outside of these requirements.

    a. Provide Shop Drawings indicating sanitary and storm cleanout locations and type to Architect for approval prior to installation.

    b. Provide Shop Drawings indicating access panel locations, size and elevation for approval prior to installation.

12. Samples: Provide samples when requested by individual Sections.

13. Resubmission Requirements:

    a. Make any corrections or change in submittals when required. Provide submittals as specified. The engineer will not be required to edit and/or interpret the Contractor's submittals. Indicate changes for the resubmittal in a cover letter with reference to page(s) changed and reference response to comment. Cloud changes in the submittals.

        1) Resubmit for review until review indicates no exception taken or "make corrections as noted".

        2) When submitting drawings for Engineers re-review, clearly indicate changes on drawings and "cloud" any revisions. Submit a list describing each change.

14. Operation and Maintenance Manuals, Owner's Instructions:

    a. Submit, at one time, electronic files (PDF format) of manufacturer's operation and maintenance instruction manuals and parts lists for equipment or items requiring servicing. Include valve charts. Submit data when work is substantially complete and in same order format as submittals. Include name and location of source parts and service for each piece of equipment.

        1) Include copy of approved submittal data along with submittal review letters received from Engineer. Data to clearly indicate installed equipment model numbers. Delete or cross out data pertaining to other equipment not specific to this project.

        2) Include copy of manufacturer's standard Operations and Maintenance for equipment. At front of each tab, provide routine maintenance documentation for

scheduled equipment. Include manufacturer's recommended maintenance schedule and highlight maintenance required to maintain warranty. Furnish list of routine maintenance parts, including part numbers, sizes, quantities, relevant to each piece of equipment: belts, motors, lubricants, and filters.

3) Include copy of complete parts list for equipment. Include available exploded views of assemblies and sub assemblies.

4) Include copy of startup and test reports specific to each piece of equipment.

5) Include copy of final water systems balancing log along with pump operating data.

6) Include commissioning reports.

7) Include copy of pressure, flow, leakage and purity test data and water systems test data, as applicable. Include copy of third-party and state and local jurisdiction inspection reports.

8) Include copy of valve charts/schedules.

9) Include Warranty per Division 00, Procurement and Contracting Requirements and Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

10) Include product certificates of warranties and guarantees.

11) Engineer will return incomplete documentation without review. Engineer will provide one set of review comments in Submittal Review format. Contractor must arrange for additional reviews; Contractor to bear costs for additional reviews at Engineer's hourly rates.

b. Thoroughly instruct Owner in proper operation of equipment and systems. Where noted in individual Sections, training will include classroom instruction with applicable training aids and systems demonstrations. Field instruction per Section 22 00 00, Plumbing Basic Requirements article titled "Demonstration".

c. Copies of certificates of code authority inspections, acceptance, code required acceptance tests, letter of conformance and other special guarantees, certificates of warranties, specified elsewhere or indicated on Drawings.

15. Record Drawings:

a. Maintain at site at least one set of drawings for recording “As-constructed” conditions. Indicate on Drawings changes to original documents by referencing revision document, and include buried elements, location of cleanouts, and location of concealed mechanical items. Include items changed by field orders, supplemental instructions, and constructed conditions.

b. Record Drawings are to include equipment and fixture/connection schedules that accurately reflect "as constructed or installed" for project.

c. At completion of project, input changes to original project on CAD Drawings and make one set of black-line drawings created from CAD Files in version/release equal to contract drawings. Submit CAD Files and drawings upon substantial completion.

d. Provide Invert elevations and dimensioned locations for water services, building waste, and storm drainage piping below grade extending to 5-feet outside building line.

e. See Division 22, Plumbing individual Sections for additional items to include in record drawings.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Work and materials installed to conform with all local, State and Federal codes, and other applicable laws and regulations. Where code requirements are at variance with Contract Documents, meet code requirements as a minimum requirement and include costs necessary to meet these in Contract. Machinery and equipment are to comply with OSHA requirements, as currently revised and interpreted for equipment manufacturer requirements. Install equipment provided per manufacturer recommendations.

B. Whenever this Specification calls for material, workmanship, arrangement or construction of higher quality and/or capacity than that required by governing codes, higher quality and/or capacity take precedence.

C. Drawings are intended to be diagrammatic and reflect the Basis of Design manufacturers equipment. They are not intended to show every item in its exact dimensions, or details of equipment or proposed systems layout. Verify actual dimensions of systems (i.e., piping) and equipment proposed to assure that systems and equipment will fit in available space. Contractor is responsible for design and construction costs incurred for equipment other than Basis of Design, including, but not limited to, architectural, structural, electrical, HVAC, fire sprinkler, and plumbing systems.

D. Manufacturer's Instructions: Follow manufacturer's written instructions. If in conflict with Contract Documents, obtain clarification. Notify Engineer/Architect, in writing, before starting work.

E. Items shown on Drawings are not necessarily included in Specifications or vice versa. Confirm requirements in all Contract Documents.

F. Provide products that are UL listed.

G. Piping Insulation products to contain less than 0.1 percent by weight PBDE in all insulating materials.

H. All potable water system components, devices, material, or equipment containing a weighted average of greater than 0.25 percent lead are prohibited, and shall be certified in accordance

with current editions of the Safe Drinking Water Act (SDWA), NSF 61 & NSF 372. Endpoint devices used to dispense water for drinking shall meet the requirements of NSF 61.

I. ASME Compliance: ASME listed water heaters and boilers with an input of 200,000 BTUH and higher, hot water storage tanks which exceed 120 gallons, and hot water expansion tanks which are connected to ASME rated equipment or required by code or local jurisdiction.

J. Provide safety controls required by National Boiler Code (ASME CSD 1) for boilers and water heaters with an input of 400,000 BTUH and higher.

1.6 WARRANTY

A. Provide written warranty covering the work for a period of one year from date of Substantial Completion in accordance with Division 00, Contracting and Procurement Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Sections under this Division can require additional and/or extended warranties that apply beyond basic warranty in Division 01, General Requirements and the General Conditions. Confirm requirements in all Contract Documents.

1.7 COORDINATION DOCUMENTS

A. Prior to construction, coordinate installation and location of HVAC equipment, ductwork, grilles, diffusers, piping, plumbing equipment/fixtures, fire sprinklers, plumbing, cable trays, lights, and electrical services with architectural and structural requirements, and other trades (including ceiling suspension, and tile systems), and provide maintenance access requirements. Coordinate with submitted architectural systems (i.e. roofing, ceiling, finishes) and structural systems as submitted, including footings and foundation. Identify zone of influence from footings and ensure systems are not routed within the zone of influence.

B. Advise Architect in the event a conflict occurs in location or connection of equipment. Bear costs resulting from failure to properly coordinate installation or failure to advise Architect of conflict.

C. Submit final Coordination Drawings with changes as Record Drawings at completion of project.

1.8 WORK INCLUDED

A. Furnish and install sleeves, inserts and anchorage required for the installation, which are embedded in work of other trades. Sleeve, wrap and seal piping in concrete.

B. Electrical: For plumbing trim/devices/equipment, provide, from the line voltage connection by Division 26, the low voltage electrical connections and wiring as required for complete and operable system. Includes, but is not limited to: Low voltage electrical raceway, wiring and accessories, such as step-down transformers as necessary for function of sensors and automatic valve and faucet controls. Supply step-down transformers and size wiring as recommended by manufacturer of plumbing trim/faucets requiring electrical low voltage

connection.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Articles, fixtures, and equipment of a kind to be standard product of one manufacturer, including but not limited to fixtures, pumps, drains and equipment.

2.2 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Base contract upon furnishing materials as specified. Materials, equipment, and fixtures used for construction are to be new, latest products as listed in manufacturer's printed catalog data and are to be UL or ETL listed and labeled or be approved by State, County, and City authorities prior to procurement and installation.

B. Names and manufacturer's names denote character and quality of equipment desired and are not to be construed as limiting competition.

C. Hazardous Materials:

1. Comply with local, State of California, and Federal regulations relating to hazardous materials.

2. Comply with Division 00, Procurement and Contracting Requirements and Division 01, General Requirements for this project relating to hazardous materials.

3. Do not use any materials containing a hazardous substance. If hazardous materials are encountered, do not disturb; immediately notify Owner and Architect. Hazardous materials will be removed by Owner under separate contract.

PART 3 - EXECUTION

3.1 ACCESSIBILITY AND INSTALLATION

A. Confirm Accessibility and Installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Install equipment requiring access (i.e., drain pans, drains, control operators, valves, motors, cleanouts and water heaters) so that they may be serviced, reset, replaced or recalibrated by service people with normal service tools and equipment. Do not install equipment in obvious passageways, doorways, scuttles or crawlspaces which would impede or block intended usage.

C. Install equipment and products complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of equipment and examine instructions thoroughly. When requirements of installation instructions conflict with Contract Documents, request clarification from Architect prior to proceeding with installation. This includes proper installation methods, sequencing, and coordination with other

trades and disciplines.

D. Earthwork:

1. Confirm Earthwork requirements in Contract Documents. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

   a. Perform excavation, dewatering, shoring, bedding, and backfill required for installation of work in this Division in accordance with the provisions of related earthwork Sections/divisions. Contact utilities and locate existing utilities prior to excavation. Repair any work damaged during excavation or backfilling.

   b. Excavation: Do not excavate under footings, foundation bases, or retaining walls.

   c. Provide protection of underground systems. Review the project Geotechnical Report for references to corrosive or deleterious soils which will reduce the performance or service life of underground systems materials.

E. Firestopping:

1. Confirm Firestopping requirements in Division 07, Thermal and Moisture Protection. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

   a. Coordinate location and protection level of fire and/or smoke rated walls, ceilings, and floors. When these assemblies are penetrated, seal around piping, ductwork and equipment with approved firestopping material. Install firestopping material complete as directed by manufacturer's installation instructions. Meet requirements of ASTM E814, Standard Test Method for Fire Tests of Through-Penetration Fire Stops.

F. Pipe Installation:

1. Provide installation of piping systems coordinated to account for expansion and contraction of piping materials and building as well as anticipated settlement or shrinkage of building. Install work to prevent damage to piping, equipment, and building and its contents. Provide piping offsets, loops, expansion joints, sleeves, anchors or other means to control pipe movement and minimize forces on piping. Verify anticipated settlement and/or shrinkage of building with Project Structural Engineer. Verify construction phasing, type of building construction products and rating for coordinating installation of piping systems.

2. Include provisions for servicing and removal of equipment without dismantling piping.

G. Plenums:

1. Provide plenum rated materials that meet the requirements to be installed in plenums. Immediately notify Architect/Engineer of discrepancy.

3.2 SEISMIC CONTROL

A. Confirm Seismic Control requirements in Division 01, General Requirements, Structural documents, and individual Division 22 Plumbing Sections.

B. General:

1. Earthquake resistant designs for Plumbing (Division 22) equipment and distribution, i.e. motors, plumbing systems, piping, equipment, water heaters, boilers, etc. to conform to regulations of jurisdiction having authority.

2. Restraints which are used to prevent disruption of function of piece of equipment because of application of horizontal force to be such that forces are carried to frame of structure in such a way that frame will not be deflected when apparatus is attached to a mounting base and equipment pad, or to structure in normal way, utilizing attachments provided. Secure equipment and distribution systems to withstand a force in direction equal to value defined by jurisdiction having authority.

3. Provide stamped Shop Drawings from licensed Structural Engineer of seismic bracing and seismic movement assemblies for piping equipment and water heaters. Submit Shop Drawings along with equipment submittals.

4. Provide stamped Shop Drawings from licensed Structural Engineer of seismic flexible joints for piping and crossing building expansion or seismic joints. Submit Shop Drawings along with seismic bracing details.

C. Piping:

1. Per "Seismic Restraints Manual Guidelines for Mechanical Systems" latest edition published by SMACNA or local requirements.

D. Provide means to prohibit excessive motion of plumbing equipment during earthquake.

3.3 REVIEW AND OBSERVATION

A. Confirm Review and Observation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Notify Architect, in writing, at following stages of construction so that they may, at their option, visit site for review and construction observation:

1. Underground piping installation prior to backfilling.

2. Prior to covering walls.

3. Prior to ceiling cover/installation.

4. When main systems, or portions of, are being tested and ready for inspection by AHJ.

C. Bear responsibility and cost to make piping accessible, to expose concealed lines, or to demonstrate acceptability of the system. If Contractor fails to notify Architect at times prescribed above, costs incurred by removal of such work are the responsibility of the Contractor.

D. Final Punch:

1. Prior to requesting a final punch visit from the Engineer, request from Engineer the Plumbing Precloseout Checklist, complete the checklist confirming completion of systems' installation, and return to Engineer. Request a final punch visit from the Engineer, upon Engineer's acceptance that the plumbing systems are ready for final punch.

2. Costs incurred by additional trips required due to incomplete systems will be the responsibility of the Contractor.

3.4 CUTTING AND PATCHING

A. Confirm Cutting and Patching requirements in Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. Proposed floor cutting/core drilling/sleeve locations to be approved by Project Structural Engineer. Submit proposed locations to Architect/Project Structural Engineer. Where slabs are of post tension construction, perform x-ray scan of proposed penetration locations and submit scan results including proposed penetration locations to Project Structural Engineer/Architect for approval. Where slabs are of waffle type construction, show column cap extent and cell locations relative to proposed penetration(s).

2. Cutting, patching and repairing for work specified in this Division including plastering, masonry work, concrete work, carpentry work, and painting included under this Section will be performed by skilled craftsmen of each respective trade in conformance with appropriate Division of Work.

3. Additional openings required in building construction to be made by drilling or cutting. Use of jack hammer is specifically prohibited. Patch openings in and through concrete and masonry with grout.

4. Restore new or existing work that is cut and/or damaged to original condition. Patch and repair specifically where existing items have been removed. This includes repairing and painting walls, ceilings, etc. where existing piping and devices are removed as part of this project. Where alterations disturb lawns, paving, and walks, surfaces to be repaired, refinished and left in condition matching existing prior to commencement of work.

5. Additional work required by lack of proper coordination will be provided at no additional cost to the Owner.

3.5 EQUIPMENT SELECTION AND SERVICEABILITY

A. Replace or reposition equipment which is too large or located incorrectly to permit servicing, at no additional cost to Owner.

3.6 DELIVERY, STORAGE AND HANDLING

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. Handle materials delivered to project site with care to avoid damage. Store materials on site inside building or protected from weather, dirt and construction dust. Insulation and lining that becomes wet from improper storage and handling to be replaced before installation. Products and/or materials that become damaged due to water, dirt and/or dust as a result of improper storage to be replaced before installation.

2. Protect equipment and pipe to avoid damage. Close pipe openings with caps or plugs. Keep motors and bearings in watertight and dustproof covers during entire course of installation.

3. Protect bright finished shafts, bearing housings and similar items until in service.

3.7 DEMONSTRATION

A. Confirm Demonstration requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Upon completion of work and adjustment of equipment and test systems, demonstrate to Owner's Authorized Representative, Architect and Engineer that equipment furnished and installed or connected under provisions of these Specifications functions in manner required. Provide field instruction to Owner's Maintenance Staff as specified in Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

C. Manufacturer's Field Services: Furnish services of a qualified person at time approved by Owner, to instruct maintenance personnel, correct defects or deficiencies, and demonstrate to satisfaction of Owner that entire system is operating in satisfactory manner and complies with requirements of other trades that may be required to complete work. Complete instruction and demonstration prior to final job site observations.

3.8 CLEANING

A. Confirm cleaning requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Upon completion of installation, thoroughly clean exposed portions of equipment, removing temporary labels and traces of foreign substances. Throughout work, remove construction

debris and surplus materials accumulated during work.

3.9 INSTALLATION

A. Confirm installation requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Install equipment and fixtures in accordance with manufacturer's installation instructions, plumb and level and firmly anchored to vibration isolators. Maintain manufacturer's recommended clearances.

C. Start up equipment, in accordance with manufacturer's start-up instructions, and in presence of manufacturer's representative. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

1. Do not place equipment in sustained operation prior to initial balancing of plumbing systems.

2. Provide pump impellers to obtain Basis of Design design capacities.

D. Provide miscellaneous supports/metals required for installation of equipment and piping.

3.10 PAINTING

A. Confirm requirements in Division 01, General Requirements and Division 09, Finishes. In absence of specific requirements, comply with individual Division 22, Plumbing Sections and the following:

1. Ferrous Metal: After completion of plumbing work, thoroughly clean and paint exposed supports constructed of ferrous metal surfaces, i.e., hangers, hanger rods, equipment stands, with one coat of black asphalt for exterior or black enamel for interior, suitable for hot surfaces.

2. In a mechanical room, on roof or other exposed areas, machinery and equipment not painted with enamel to receive two coats of primer and one coat of rustproof enamel, colors as selected by Architect.

3. See individual equipment Specifications for other painting.

4. Structural Steel: Repair damage to structural steel finishes or finishes of other materials damaged by cutting, welding or patching to match original.

5. Piping: Clean, primer coat and paint exposed piping on roof or at other exterior locations with two coats paint suitable for metallic surfaces and exterior exposures. Color selected by Architect.

6. Covers: Covers such as manholes, cleanouts and the like will be furnished with finishes which resist corrosion and rust.

3.11 ACCEPTANCE

A. Confirm requirements in Division 00, Procurement and Contracting Requirements and Division 01, General Requirements. In absence of specific requirements, comply with individual Sections in Division 22, Plumbing and the following:

1. System cannot be considered for acceptance until work is completed and demonstrated to Architect that installation is in strict compliance with Specifications, Drawings and manufacturer's installation instructions, particularly in reference to following:

a. Testing and Balancing Reports

b. Cleaning

c. Operation and Maintenance Manuals

d. Training of Operating Personnel

e. Record Drawings

f. Warranty and Guaranty Certificates

g. Start-up/Test Document and Commissioning Reports

3.12 FIELD QUALITY CONTROL

A. Confirm Field Quality Control requirements in Division 00, Procurement and Contracting Requirements, Division 01, General Requirements, Section 22 00 00, Plumbing Basic Requirements and individual Division 22, Plumbing Sections.

B. Tests:

1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified. Reference individual Specification Sections for required tests. Document tests and include in operation and maintenance manuals.

2. During site evaluations by Architect or Engineer, provide appropriate personnel with tools to remove and replace trims, covers, and devices so that proper evaluation of installation can be performed.

3.13 LETTER OF CONFORMANCE

A. Provide Letter of Conformance, copies of manufacturers' warranties and extended warranties with a statement that plumbing items were installed in accordance with manufacturer's recommendations, UL listings and FM Global approvals. Include Letter of Conformance, copies of manufacturers' warranties and extended warranties in Operation and Maintenance Manuals.

3.14 ELECTRICAL INTERLOCKS

A. Where equipment motors are to be electrically interlocked with other equipment for simultaneous operation, utilize plumbing equipment wiring diagrams to coordinate with electrical systems so that proper wiring of equipment involved is affected.

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Pipe Hangers and Supports for Plumbing Piping
2. Building Attachments
3. Flashing
4. Miscellaneous Metal and Materials

1.2 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.7 PERFORMANCE REQUIREMENTS

A. General - Provide pipe and equipment hangers and supports in accordance with the following:

1. When supports, anchorages, and seismic restraints for equipment, and supports, anchorages, and seismic restraints for piping are not shown on the Drawings, the contractor is responsible for their design.

2. Connections to structural framing are not to introduce twisting, torsion, or lateral bending in the framing members. Provide supplementary steel as required.

B. Engineered Support Systems:

1. Support frames such as pipe racks or stanchions for piping and equipment which provide support from below.

2. Equipment and piping support frame anchorage to supporting slab or structure.

C. Provide channel support systems, for piping to support multiple pipes capable of supporting the combined weight of supported systems, system contents and test water.

D. Provide heavy-duty steel trapezes for piping to support multiple pipes capable of supporting the combined weight of supported systems, system contents and test water.

E. Provide seismic restraint hangers and supports for piping and equipment.

F. Obtain approval from AHJ for seismic restraint hanger and support system to be installed for piping and equipment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Pipe Hangers and Supports for Plumbing Piping and Equipment:

1. Pipe Hangers/Supports:

a. B-Line Systems Inc.

b. Anvil International

c. HOLDRITE

d. Erico Co. Inc.

e. Snappitz Thermal Pipe Shield Manufacturing

f. Rilco Manufacturing Co. Inc.

g. Nelsen-Olson Inc.

2. Channel Support Systems:

a. B-Line Systems Inc.

b. Anvil International, Anvit-Strut

c. Erico Hanger Co. Inc.; O-Strut Div.

d. Unistrut Corp.

e. HOLDRITE EZ-Strut Systems

3. Thermal-Hanger Shield Inserts:

a. Erico Hanger Co. Inc.

b. Pipe Shields, Inc.

c. Rilco Manufacturing Co. Inc.

d. HOLDRITE Insulation Couplings

4. Freestanding Roof Supports:

a. Miro

b. Nelson-Olsen Inc. / Quick "Pipe" Block

c. Eaton / B-Line / Dura-Blok

d. Mifab

5. Pipe Alignment and Secondary Supports:

a. HOLDRITE

b. Starquick

B. Building Attachments:

1. Anchor-It

2. Gunnebo Fastening Corp.

3. ITW Ramset / Red Head

4. Masterset Fastening Systems, Inc.

C. Flashing:

1. Fastenal

2. Or approved equivalent.

D. Miscellaneous Metal and Materials:

1. See Miscellaneous Metal and Materials article below.

2. Powder-Actuated Fastener Systems:

a. Gunnebo Fastening Corp.

b. Hilti, Inc.

c. ITW Ramset / Red Head

d. Masterset Fastening Systems, Inc.

2.2 PIPE HANGERS AND SUPPORTS FOR PLUMBING PIPING

A. Horizontal Piping Hangers and Supports - Horizontal and Vertical Piping, and Hanger Rod Attachments:

1. Factory fabricated horizontal piping hangers and supports to suit piping systems in accordance manufacturer's published product information.

2. Use only one type by one manufacturer for each piping service.

3. Select size of hangers and supports to exactly fit pipe size for bare piping and to exactly fit around piping insulation with saddle or shield for insulated piping.

4. Provide copper-plated hangers and supports for uninsulated copper piping systems.

5. Provide padded pipe hangers, clamps and supports for thermoplastic piping system.

6. Install no hub cast iron pipe and fittings per CISPI 301-09 Installation Procedures for Hubless Cast Iron Pipe and Fittings for Sanitary and Storm Drain Waste and Vent Piping Applications. Brace hubless cast iron pipe and fittings 5-inch and larger with HOLDRITE No Hub Pipe Restraints or approved equivalent.

B. Pipe Hangers, Guides and Channel Systems:

1. Hanger Rods: Hanger rods continuously threaded or threaded ends only in concealed spaces and threaded ends only in exposed spaces; finish electro-galvanized or cadmium-plated in concealed spaces and prime painted in exposed spaces; sizes per MSS.

2. Hanger Rod Couplings: Malleable iron rod coupling with elongated center sight gap for visual inspection; to have same finish as hanger rods.

3. Pipe Rings for Hanger Rods: Pipe sizes 2-inch and smaller, MSS SP Type 6 or Type 10, or approved equivalent. Pipe sizes 2-1/2-inches and larger, clevis type hangers with adjustable nuts on rod. MSS SP Type 1. Pipe rings to have same finish as hanger rods.

4. Pipe Slides: Type 35 reinforced Teflon slide material (3/32-inch minimum thickness) bonded to steel; highly finished steel or stainless steel contact surfaces to resists corrosion; 60-80 PSI maximum active contact surface loading; steel parts 3/16-inch minimum thickness; attachment to pipe and framing by welding.

5. Pipe Guides:

a. Furnish and install pipe guides on continuous runs where pipe alignment must be maintained. Minimum two on each side of expansion joints, spaced per manufacturer's recommendations for pipe size. Fasten guides securely to pipe and structure. Any contact with chilled water pipe is not to permit heat to be transferred in sufficient quantity to cause condensation on any surface.

b. Furnish and install guides approximately 4 pipe diameters (first guide) and 14 diameters (second guide) away from each end of expansion joints. Guides are not to be used as supports and are in addition to other pipe hangers and supports.

6. Channel Type Pipe Hanging System: Framing members No. 12 gauge formed steel channels, 1-5/8-inch square, conforming to ASTM A1011 GR33; one side of channel to have a continuous slot with in-turned lips; framing nut with grooves and spring 1/2-inch size, conforming to ASTM 675 GR60; screws conforming to ASTM A307; fittings conforming to ASTM A575; parts enamel painted or electro-galvanized.

C. Pipe Saddles and Shields:

1. Factory fabricated saddles or shields under piping hangers and supports for insulated piping.

2. Size saddles and shields for exact fit to mate with pipe insulation. 1/2 round, 18 gauge, minimum 12-inches in length (4-inch pipe and larger to be three times longer than pipe diameter).

D. Thermal-Hanger Shield Inserts: 100-PSI (690-kPa) minimum compressive strength insulation, encased in sheet metal shield.

1. Material for Cold Piping: Water-repellent-treated, ASTM C533, Type I calcium silicate with vapor barrier.

2. Material for Hot Piping: Water-repellent-treated, ASTM C533, Type I calcium silicate.

3. For Trapeze or Clamped System: Insert and shield cover entire circumference of pipe.

4. For Clevis or Band Hanger: Insert and shield to cover lower 180 degrees of pipe.

5. Insert Length: Extend 2-inches beyond sheet metal shield for piping operating below ambient air temperature.

6. Thermal Hanger Shield Inserts should be provided at the hanger points and guide locations on pipes requiring insulation. The Inserts should consist of Polyisocyanurate (urethane or phenolic insulation) encircling the entire circumference of the pipe with a 360 degree PVC (1.524 mm thick) with a living hinge and J lock and installed during the installation of the piping system.

E. Roller Hangers:

1. Adjustable roller hanger. Black steel yoke, cast iron roller. MSS Type 41.

F. Concrete Inserts:

1. Malleable iron body, hot dipped galvanized finish. Lateral adjustment. MSS Type 18.

G. Continuous Concrete Insert:

1. Steel construction, minimum 12 gauge. Electrogalvanized finish. Pipe clamps and insert nuts to match.

H. Beam Clamps:

1. MSS Type 19 and 23, wide throat, with retaining clip.

2. Universal Side Beam Clamp: MSS Type 20.

I. Hangers for Pipe Size 2-inches and Smaller:

1. Adjustable swivel ring hanger, UL listed, Type 6 or Type 10.

J. Hangers for Pipe Size 2-1/2-inches and Larger:

1. Adjustable clevis type, UL listed, Type 1.

K. Riser Clamps:

1. Steel, UL listed. MSS Type 8.

L. Plumbers Tape:

1. Not permitted as pipe hangers or pipe straps.

M. Pipe Alignment and Secondary Support Systems:

1. Secondary Pipe supports for general applications (Non-Acoustical).

a. Supports will be manufactured in compliance with IAPMO Product Standard PS 42-96. All products provided will be listed by IAPMO for secondary pipe support.

b. Supports may be used when sound and/or vibration transfer is not a concern.

2. Secondary pipe supports for sound and vibration attenuation (Acoustical).

a. Supports will be manufactured in compliance with IAPMO Product Standard PS 42-96. All products provided will be listed by IAPMO for secondary pipe support.

b. Acoustical pipe supports will be manufactured and installed in compliance with International Organization for Standardization (ISO) 3822-1 with current amendments.

c. Supports will be used when sound and/or vibration transfer is a concern. Locations where acoustical supports will be provided and include but are not limited to partition walls between living units, tenant spaces, retail units, mechanical rooms and lobbies.

d. Support Products:

1) Support to Wall Brace and Wall Stud Penetrations: HOLDRITE #261, #262, #263, and #264, or approved equivalent.

2) Pipe Wrap for Pipe Clamps and Channel-Mounted Pipe Clamps: HOLDRITE #270, or approved equivalent.

3) Pipe Wrap for Pipe Hangers: HOLDRITE #271, #272-2, and #272-4, or approved equivalent.

4) Drop-Ear Fitting Support: HOLDRITE #265, or approved equivalent.

5) Floor Riser Isolation Pads: HOLDRITE #275-T, or approved equivalent.

6) Floor Isolation Pads (General Applications): HOLDRITE #274, #275, #276, and #278, or approved equivalent.

N. Freestanding Roof Pipe Supports:

1. Polyethylene high-density UV resistant block with foam pad or 100 percent UV resistant recycled rubber. With galvanized strut/channel.

2.3 BUILDING ATTACHMENTS

A. General: Anchor supports to existing masonry, block and tile walls per anchoring system manufacturer's recommendations or as modified by project Structural Engineer. Provide anchor bolts suitable for cracked concrete.

B. Anchor Bolts:

1. Anchor Bolts (Cast-In-Place): Steel bolts, ASTM A307. Nuts to conform to ASTM A194. Design values for shear and tension not more than 80 percent of the allowable listed loads.

2. Anchor (Expansion) Bolts: Carbon steel to ASTM A307; nut to conform to ASTM A194; drilled-in type. Design values for shear and tension not more than 80 percent of the allowable listed loads.

3. Anchor (Adhesive) Bolts: Consisting of two-part adhesive cartridge and zinc-plated Type A307 steel anchor bolt rod assembly with ASTM A194 nut.

C. Beam Clamps:

1. MSS Type 19 and 23, wide throat, with retaining clip.

2. Universal Side Beam Clamp: MSS Type 20.

D. Powder-Actuated Drive Pin Fasteners:

1. Powder-Actuated Drive-Pin Fasteners: Powder actuated type, drive pin attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

E. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

F. Grout: ASTM C1107, Grade B, factory mixed and packaged, non-shrink and nonmetallic, dry, hydraulic-cement grout.

1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.

2. Properties: Non-staining, noncorrosive, and non-gaseous.

3. Design Mix: 5000-PSI (34.5-MPa), 28-day compressive strength.

2.4 FLASHING

A. Steel Flashing: 26 gauge galvanized steel.

B. Safes: 8 mil thick neoprene.

C. Caps: Steel, 22 gauge minimum, 16 gauge at fire-resistant structures.

D. Provide hot dipped galvanized components for items exposed to weather.

2.5 MISCELLANEOUS METAL AND MATERIALS

A. Miscellaneous Metal: Provide miscellaneous metal items specified hereunder, including materials, fabrication, fastenings and accessories required for finished installation, where indicated on Drawings or otherwise not shown on drawings, that are necessary for completion of the project. The Contractor is responsible for their design.

1. Fabricate miscellaneous units to size, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise shown, fabricate from structural steel shapes and plates and steel bars, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

B. Structural Shapes: Where miscellaneous metal items are needed to be fabricated from structural steel shapes and plates, provide members constructed of steel conforming with requirements of ASTM A36 or approved equivalent.

C. Steel Pipe: Provide seamless steel pipe conforming to requirements of ASTM A53, Type S, Grade A, or Grade B. Weight and size required as specified.

D. Fasteners: Provide fasteners of types as required for assembly and installation of fabricated items; surface-applied fasteners are specified elsewhere.

E. Bolts: Low carbon steel externally and internally threaded fasteners conforming with requirements of ASTM A307; include necessary nuts and plain hardened washers. For structural steel elements supporting mechanical material or equipment from building structural members or connection thereto, use fasteners conforming to ASTM A325.

F. Miscellaneous Materials: Provide incidental accessory materials, tools, methods and equipment required for fabrication.

G. Provide hot dipped galvanized components for items exposed to weather.

H. Use straps, threshold rods and wire with sizes required by SMACNA to support piping.

I. Grout: ASTM C1107, Grade B, factory mixed and packaged, non-shrink and nonmetallic, dry, hydraulic-cement grout.

1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.

2. Properties: Non-staining, noncorrosive, and non-gaseous.

3. Design Mix: 5000-PSI (34.5-MPa), 28-day compressive strength.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Examination:

1. Verify building materials to have hangers and attachments affixed in accordance with hangers to be used. Provide supporting calculations.

B. Preparation:

1. Examine Drawings and coordinate for verification of exact locations of fire and smoke rated walls, partitions, floors and other assemblies. Indicate, by shading and labeling on Record Drawings such locations and label as "1-Hour Wall," "2-Hour Fire/Smoke Barrier," and the like. Determine proper locations for piping penetrations. Set sleeves in place in new floors, walls or roofs prior to concrete pour or grouting.

C. Install hangers, supports, anchors and sleeves after required building structural work has been completed in areas where the work is to be installed. Coordinate with project structural engineer proper placement of inserts, anchors and other building structural attachments.

3.2 PIPE HANGERS AND SUPPORTS FOR PLUMBING PIPING

A. Hangers and Supports:

1. Comply with MSS SP-58. Pipe Hanger and Support Installation: Install hangers, supports, clamps, and attachments as required to properly support piping from building structure. For horizontally hung grooved-end piping, provide a minimum of 2 hangers per pipe section.

2. Pipe Ring Diameters:

   a. Uninsulated and Insulated Pipe, except where oversized pipe rings are specified: Ring inner diameter to suit pipe outer diameter.

   b. Insulated Piping Where Oversized Pipe Rings are Specified and Vibration Isolating Sleeves: Ring inner diameter to suit outer diameter of insulation or sleeve.

3. Oversize Pipe Rings: Provide oversize pipe rings of 2-inch and larger size.

4. Pipe Support Brackets: Support pipe with pipe slides.

5. Steel Backing in Walls: Provide steel backing in walls to support fixtures and piping hung from steel stud walls.

6. Channel Support System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled channel systems.

   a. Field assemble and install according to manufacturer's written instructions.

7. Pipe Guides:

   a. Install on continuous runs where pipe alignment must be maintained. Provide a minimum of two on each side of expansion joints, spaced per manufacturer's recommendations for pipe size. Fasten guides to pipe structure. Any contact with chilled water pipe should not permit heat to be transferred in sufficient quantity to cause condensation on any surface.

   b. Install approximately 4 pipe diameters (first guide) and 14 diameters (second guide) away from each end of expansion joints. Do not use as supports. Provide in addition to other required pipe hangers and supports.

8. Heavy-Duty Steel Trapeze Installation: Arrange for grouping of parallel runs of horizontal piping and support together on field -fabricated, heavy-duty trapezes.

   a. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.

b. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D-1.1

9. Group parallel runs of horizontal piping to be supported together on trapeze-type hangers.

10. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe.

11. Do not support piping from other piping.

12. Fire protection piping will be supported independently of other piping.

13. Prevent electrolysis in support of copper tubing by use of hangers and supports which are copper plated.

14. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories.

15. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchor, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units.

16. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

17. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping" is not exceeded.

18. Insulated Piping: (comply with the following)

    a. Attach clamps and spacers to piping.

        1) Piping Operating above Ambient Air Temperature: Clamp may project through insulation.

        2) Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.

        3) Do not exceed pipe stress limits according to ASME B31.9.

    b. Install MSS SP-58, Type 39 protection saddles, if insulation without a vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.

        1) Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.

c. Install MSS SP-58, Type 40 protective shields on cold piping having a vapor barrier. Shields to span arc of 180 degrees.

1) Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 (DN100) and larger if pipe is installed on rollers.

d. Shield Dimensions for Pipe, not less than the following:

1) NPS 1/4 to NPS 3-1/2 (DN8 to DN 90): 12-inches long and 0.048-inch thick.

2) NPS 4 (DN100): 12-inches long and 0.06-inch thick.

3) NPS 5 and NPS 6 (DN125 and DN150): 18-inches long and 0.06-inch thick.

4) NPS 8 to NPS 14 (DN200 to DN350): 24-inches long and 0.075-inch thick.

5) NPS 16 to NPS 24 (DN400 to DN600): 24-inches long and 0.105-inch thick.

e. Pipes NPS 8 (DN200) and Larger: Include wood inserts.

f. Insert Material: Length at least as long as protective shield.

g. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

19. Pipe supports and hanger spacing (pipe supported from structure or floor-supported) to meet the requirements of References and Standards Article in Part 1 above.

B. Pipe Curb Assemblies:

1. Provide for piping and electrical conduit which penetrates the structural roof deck to service equipment above the roof level (e.g., piping, electrical power and control wiring). Meet requirements of roof warranty.

2. Provide prefabricated units for roof membrane and insulation penetrations related to equipment. Coordinate with roofing system. Set supports on the structural deck. Do not set supports on insulation or roofing. Provide level supports by prefabricated pitch built into the curb.

3. Piping above roof to be supported with freestanding roof pipe supports unless detailed otherwise. At roofing applications, the adhesion mastic is to be specifically submitted to and approved by the roofing system manufacturer/installer to maintain the integrity of all warranties.

4. At concrete floors, install a polyurethane mastic to the support block and adhere in place.

C. Vertical Piping:

1. Support with U-clamps fastened to wall to hold piping away from wall unless otherwise approved.

2. Riser clamps to be directly under fitting or welded to pipe.

3. Riser to be supported at each floor penetration.

4. Provide structural steel supports at the base of pipe risers. Size supports to carry forces exerted by piping system when in operation.

D. Adjusting and Painting:

1. Adjust hangers so as to distribute loads equally on attachments. Provide grout under supports to bring piping and equipment to proper level and elevations.

2. Prime paint ferrous nongalvanized hangers, accessories, and supplementary steel which are not factory painted.

3.3 BUILDING ATTACHMENTS

A. Install within concrete slabs or attach to structural steel or wood. Install additional building attachments where support is required for additional concentrated loads, including valves, flanges, guides, strainers, expansion joints and at changes in direction of piping.

B. Attachment to Wood Structure: Provide MSS Type 34 for attachment to wooden beam or approved attachment for a wood structure.

C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

D. Install concrete inserts before concrete is placed; fasten insert secure to forms. Where concrete with compressive strength less than 2500 PSI is indicated, install reinforcing bars through openings at top in inserts.

E. Install powder-actuated drive pin fasteners in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual. Test powder-actuated insert attachments with a minimum load of 100 pounds.

F. Bolting: Provide bored, drilled or reamed holes for bolting to miscellaneous structural metals, frames or for mounts or supports. Flame cut, punched or hand sawn holes will not be accepted.

G. Anchor Bolts:

1. Install anchor bolts for mechanical equipment and piping as required. Tightly fit and clamp base-supported equipment anchor bolts at equipment support points. Provide locknuts where equipment and piping are hung.

2. Anchor Bolts (Cast-In-Place): Embed anchor bolts in new cast-in-place concrete to anchor equipment. Install a pipe sleeve around the anchor bolt for adjustment of the top 1/3 of the bolt embedment; sizes and patterns to suit the installation conditions of the

equipment to be anchored.

H. Pipe Anchors: Provide anchors to fasten piping which is subject to expansion and contraction, and adjacent to equipment to prevent loading high forces onto the equipment.

I. Escutcheon Plates: Install around horizontal and vertical piping at visible penetrations through walls, partitions, floors, or ceilings, including penetrations through closets, through below ceiling corridor wall, and through equipment room walls and floors.

J. Installation of metallic or plastic piping penetrations through non fire-rated walls and partitions and through smoke-rated walls and partitions:

1. Install fabricated pipe sleeve.

2. After installation of sleeve and piping, tightly pack entire annular void between piping or piping insulation and sleeve identification with specified material.

3. Seal each end airtight with a resilient nonhardening UL listed fire resistant ASTM 814 sealant.

K. Piping Penetrations Through Fire-Rated (1 to 3 hour) Assemblies:

1. Select and install pre-engineered pipe penetration system in accordance with the UL listing and manufacturer's recommendation.

2. Provide proper sizing when providing sleeves or core-drilled holes to accommodate the penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet the requirements of ASTM E814. Use HOLDRITE HydroFlame or approved equivalent.

L. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers and other accessories.

3.4 FLASHING

A. Flash and counter flash where piping passes through weather or waterproofed walls, floors and roofs.

B. Flash vent soil pipes with flashings per Division 01, General Requirements.

C. Flash floor drains over finished areas and roof drains, 10-inches clear on sides, minimum 36-inches by 36-inches sheet size. See Division 01, General Requirements. Fasten flashing to drain with clamping device.

D. Install built up fixtures (mop sinks, shower stalls, shower floors) with water sealing systems/membranes to meet Code and as prescribed by Division 01, General Requirements and Section 22 00 00, Plumbing Basic Requirements. Meet all Code testing requirements. Provide drainage devices with appropriate flanges, clamps, etc. to meet these installation requirements and ensure a water-tight installation.

3.5 MISCELLANEOUS METAL AND MATERIALS

A. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

B. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required. Avoid cutting concrete reinforcing when drilling for inserts. Reference structural drawings and reinforcing shop drawings and determine locations of stirrups prior to drilling into concrete.

C. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plumb, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.

D. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.

E. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.

1. Set loose leveling and bearing plates on wedges or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

F. Fabrication:

1. General: Verify dimensions prior to fabrication. Form metal items to accurate sizes and configurations as indicated on Drawings and otherwise required for proper installation; make with lines straight and angles sharp, clean and true; drill, countersink, tap, and otherwise prepare items for connections with work of other trades, as required. Fabricate to detail of structural shapes, plates and bars; weld joints where practicable; provide bolts and other connection devices required. Include anchorages; clip angles, sleeves, anchor plates and similar devices. Hot dip galvanize after fabrication items installed in exterior locations. Set accurately in position as required and anchor securely to building construction. Construct items with joints formed for strength and rigidity, accurately machining for proper fit; where exposed to weather, form to exclude water.

2. Finishes:

    a. Ferrous Metal: After fabrication, but before erection, clean surfaces by mechanical or chemical methods to remove rust, scale, oil, corrosion, or other substances detrimental to bonding of subsequently applied protective coatings. For metal items exposed to weather or moisture, galvanize in manner to obtain G90 zinc coating in accordance with ASTM A123. Provide other non-galvanized ferrous metal with 1 coat of approved rust-resisting paint primer, in manner to obtain not less than 1.0 mil dry film thickness. Touch-up damaged areas with primer of same material before installation. Apply zinc coatings and paint primers uniformly and smoothly; leave ready for finish painting as specified elsewhere.

    b. Metal in contact with Concrete, Masonry and Other Dissimilar Materials:

        1) Where metal items are to be erected in contact with dissimilar materials, provide contact surfaces with coating of an approved zinc-chromate primer in manner to obtain not less than 1.0 mil dry film thickness, in addition to other coatings specified in these specifications.

    c. For Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A780.

G. Metal Fabrication:

1. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.

2. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations.

3. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of weld and methods used in correcting welding work, and with the following:

    a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.

    b. Obtain fusion without undercut or overlap.

    c. Remove welding flux immediately.

    d. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

4. Provide hot dipped galvanized components for items exposed to weather.

END OF SECTION

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SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Plastic Pipe Markers

1.2 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

B. In addition, submit Valve Schedule for each piping system, in tabular format using Microsoft Word or Excel software. Tabulate valve number, piping system, system abbreviation (as shown on tag), location of valve (room or space), and variations for identification (if any). Mark valves which are intended for emergency shutoff and similar special uses by special "flags" in margin of schedule. In addition to mounted copies, furnish extra copies for maintenance manuals. Provide schedules organized as follows:

1. Equipment Type:

a. Identification:

b. Background:

1) Size:

2) Color:

c. Lettering:

1) Size:

2) Color:

C. For renovations or expansions of existing systems, coordinate with Owner and develop valve schedule on existing schedule naming and format.

1.5 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General: Manufacturer's standard products of categories and types required for each application as referenced in other Division 22, Plumbing Sections. Where more than a single type is specified for application, provide single selection for each product category.

B. Plastic Pipe Markers:

1. Brady Corporation

2. Brimar

3. Champion America Inc.

4. Craftmark

5. Seton Identification Products

2.2 PLASTIC PIPE MARKERS

A. Color: Conform to ASME A13.1 and ANSI Z535.1.

B. Plastic Pipe Markers (for external diameters of 6-inches and larger including insulation): Factory fabricated, flexible, semi- rigid plastic, preformed to fit around pipe or pipe covering; minimum information indicating flow direction arrow and identification of fluid being conveyed.

C. Plastic Tape Pipe Markers (for external diameters less than 6-inches including insulation): Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings. Minimum information indicating flow direction arrow and identification of fluid being conveyed.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Lettering and Graphics:

1. General: Coordinate names, abbreviations and other designations used in plumbing identification work with corresponding designations shown, specified or scheduled.

Provide numbers, lettering and wording as indicated or, if not otherwise indicated, as recommended by manufacturers or as required for proper identification and operation/maintenance of mechanical systems and equipment.

2. Multiple Systems: Where multiple systems of same generic name are shown and specified, provide identification which indicates individual system number as well as service (as examples: Chiller No. 3, Air Handling Unit No. 42, Standpipe F12, and the like).

B. Preparation: Degrease and clean surfaces to receive adhesive for identification materials.

C. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.

D. Install valve schedule at each mechanical room.

E. Access Doors: Provide markers on each access door and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions.

3.2 PLASTIC PIPE MARKERS

A. Install plastic pipe markers in accordance with manufacturer's instructions.

B. Install plastic tape pipe markers complete around pipe in accordance with manufacturer's instructions.

C. For exterior underground piping installations, install underground plastic pipe markers with tracer wire 6 to 8-inches below finished grade directly above buried pipe.

D. Identify piping, concealed or exposed, with plastic tape pipe markers. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20-feet (reduced to 10-feet in congested areas and mechanical equipment rooms) on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction. Locate near branches, valves, control devices, equipment connections, access doors, floor/wall penetrations.

END OF SECTION

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SECTION 22 07 00 - PLUMBING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Type 1, Glass Wool Pipe Insulation
2. Type 2, Flexible Elastomeric Insulation
3. Accessories
4. Pipe Fitting Insulation Covers

1.2 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements apply to this Section.

1.6 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.7 FIRE HAZARD CLASSIFICATION

A. Maximum fire hazard classification of the composite insulation construction as installed to be not more than a Flame Spread Index (FSI) of 25 and Smoke Developed Index (SDI) of 50 as tested by current edition of ASTM E84 (NFPA 255) method.

B. Test pipe insulation in accordance with requirements of current edition of UL "Pipe and Equipment Coverings".

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PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Type 1, Glass Wool Pipe Insulation:

1. Owens-Corning

2. Johns Manville

B. Type 2, Flexible Elastomeric Insulation:

1. Insulation:

a. Armacell LLC Armaflex

b. K-Flex

2. Glue:

a. Armacell LLC Armaflex Low VOC Adhesive

b. K-Flex

3. Paint:

a. Armacell LLC Armaflex

b. K-Flex

C. Accessories:

1. ITW Insulation Systems

2. Or approved equivalent.

D. Pipe Fitting Insulation Covers:

1. Zeston Johns Manville

2. ITW Insulation Systems

2.2 TYPE 1, GLASS WOOL PIPE INSULATION

A. Glass Fiber: ASTM C547 Type I and IV; rigid molded, noncombustible.

1. Thermal Conductivity Value: 0.27 BTU*in/(hr*sf*F) at 75 degrees F.

2. Maximum Service Temperature: 850 degrees F to 1000 degrees F.

3. Vapor Retarder Jacket: White Kraft paper reinforced with glass fiber and bonded to aluminum foil, with self-sealing longitudinal laps and butt strips or vapor barrier mastic.

2.3 TYPE 2, FLEXIBLE ELASTOMERIC INSULATION

A. Elastomeric Foam: ASTM C534; flexible, cellular elastomeric, molded or sheet.

1. Thermal Conductivity Value: 0.25 BTU*in/(hr*sf*F) at 75 degrees F.

2. Maximum Service Temperature of 220 degrees F.

3. Maximum Flame Spread: 25.

4. Maximum Smoke Developed: 50 (3/4-inch thick and below).

5. Connection: Waterproof vapor retarder adhesive as needed.

6. UV Protection: UV outdoor protective coating per manufacturer's requirements.

B. Glue: Contact adhesive specifically manufactured for cementing flexible elastomeric foam.

C. Paint: Nonhardening high elasticity type, specifically manufactured as a protective covering of flexible elastomeric foam insulation for prevention of degradation due to exposure to sunlight and weather.

2.4 ACCESSORIES

A. Equipment Insulation Compounds: Provide adhesives, cement, sealers, mastics and protective finishes as recommended by insulation manufacturer for applications indicated.

B. Provide staples, bands, wire, wire netting, tape corner angles, anchors, stud pins and metal covers as recommended by insulation manufacturer for applications indicated. Accessories, i.e., adhesives, mastics, cements and tape to have same flame and smoke component ratings as insulation materials with which they are used. Shipping cartons to bear a label indicating that flame and smoke ratings do not exceed those listed above. Provide permanent treatment of jackets or facings to impart flame and smoke safety. Provide non-water soluble treatments. Provide UV protection recommended by manufacturer for outdoor installation.

2.5 PIPE FITTING INSULATION COVERS

A. PVC Plastic Fitting Covers: Schuller Zeston 2000, Knauf Proto Fitting or approved equivalent. One-piece molded type fitting covers and jacketing material, gloss white. Connections: Tacks; pressure sensitive color matching vinyl tape.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION INFORMATION

A. Verification of Conditions:

1. Do not apply insulation until pressure testing and inspection of piping has been completed.

2. Examine areas and conditions under which insulation will be installed. Do not proceed with work until unsatisfactory conditions have been corrected.

B. Preparation: Clean and dry surfaces to be insulated.

C. Installation:

1. Insulation: Continuous through walls, floors and partitions except where noted otherwise.

2. Piping and Equipment:

a. Install insulation over clean, dry surfaces with adjoining sections firmly butted together and covering surfaces. Fill voids and holes. Seal raw edges. Install insulation in a manner such that insulation may be split, removed, and reinstalled with vapor barrier tape on strainer caps and unions. Do not install insulation until piping has been leak tested and has passed such tests. Do not insulate manholes, equipment manufacturer's nameplates, handholes, and ASME stamps. Provide beveled edge at such insulation interruptions. Repair voids or tears.

D. Provide accessories as required. See Part 2 Article "Accessories" above.

E. Protection and Replacement: Protect installed insulation during construction. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.

F. Labeling and Marking: Provide labels, arrows and color coding on piping. Attach labels and flow direction arrows to jacketing per Section 22 05 53, Identification for Plumbing Piping and Equipment.

G. Insulation Shields: Provide hangers and shields (18 gauge minimum) outside of insulation for cold piping (<60 degrees F). Hot water piping hangers may penetrate insulation to contact pipe directly. Provide 18-inch long, noncompressible insulation section at insulation shields for lines 1-1/2-inches and larger (hot and cold piping).

H. Piping Surfaces to be Insulated:

Item to be Insulated	System Insulation Type	Pipe Size	Insulation Thickness
Cold Water Piping Above Grade	1	=<1-1/2-inch >1-1/2-inch	1/2-inch 1-inch
Above Grade Roof Drain/Overflow Drain Piping	1, 2	All	1/2-inch

3.2 TYPE 1, GLASS WOOL PIPE INSULATION

A. See General Installation Requirements above.

B. Install in accordance with manufacturer's instructions for below grade installation.

C. Lap seal insulation with waterproof adhesive. Do not use staples or other methods of attachment which would penetrate vapor barrier. Apply fitting covers with seated tacks and vapor barrier tape.

D. Apply insulation to pipe and seal with self-sealing lap. Use self-sealing butt strips to seal butt joints. Insulate fittings, valves and unions with single or multiple layers of insulation and cover to match pipe or use preformed PVC molded insulation covers.

E. Above Grade Roof Drain/Overflow Drain Piping: Cover all roof drain piping and overflow drain piping with sectional pipe covering.

3.3 TYPE 2, FLEXIBLE ELASTOMERIC INSULATION

A. See General Installation Requirements above.

B. Install in accordance with manufacturer's instructions for below grade installation.

C. Slip insulation on pipe prior to connection. Butt joints sealed with manufacturer's adhesive. Insulate fitting with miter-cut pieces. Cover insulation exposed to weather and undergrade with two coats of finish as recommended by manufacturer.

D. Above Grade Roof Drain/Overflow Drain Piping: Cover all roof drain piping and overflow drain piping with sectional pipe covering.

E. Flexible Elastomeric Tubing: Slip insulation over piping or if piping is already installed, it should be slit and snapped over piping. Joints and butt ends must be adhered with 520 adhesive.

3.4 ACCESSORIES

A. See General Installation Requirements above.

B. Install in accordance with manufacturer's instructions.

C. Furnish and install accessories for all insulation types listed in this Section.

3.5 PIPE FITTING INSULATION COVERS

A. See General Installation Requirements above.

B. Install in accordance with manufacturer's instructions.

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 22 10 00 - PLUMBING PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Sanitary, Drainage (Rain/Stormwater) DWV Piping, Above Grade

2. Cold Domestic Water Above Grade

1.2 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. See component manufacturers listed in individual articles below.

B. ADS

C. American-USA

D. Cerro

E. Charlotte

F. Clamp-All

G. Conbraco/Apollo Press

H. Elkhart

I. Enfield

J. Fuseseal

K. Husky

L. Ideal

M. Mifab

N. Mission

O. Mueller

P. Nibco

Q. Orion

R. Sioux Chief

S. Spears

T. Tyler

U. Uponor

V. Zurn

W. Firestopping Penetrations in Fire Rated Wall Floor Assemblies:

1. Hilti

2. Proset

2.2 GENERAL

A. Provide pipe, tube and fittings of the same type, fitting requirements, grade, class and the size and weight indicated or required for each service, as indicated in other Division 22, Plumbing Specifications. Where type, grade, or class is not indicated, provide proper selection as determined by installer for installation requirements, and comply with governing regulations and industry standards.

B. Manufactured materials delivered, new to the project site and stored in their original containers.

C. Product Marking: Furnish each item with legible markings indicating name brand and manufacturer, manufacturing process, heat number and markings as required per ASTM and UL/FM Standards.

2.3 SANITARY, DRAINAGE (RAIN/STORMWATER) DWV PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A888/CISPI 301 hubless.

1. Fittings: Cast iron.

2. Coupling Assembly:

a. Standard Duty: ASTM C1277 or CISPI 310.

B. PVC Pipe: ASTM D 2665 IPS Schedule 40, solid wall piping for drainage/waste and vent (DWV).

1. Fittings: PVC DWV ASTM D2665.

2. Joints: Solvent welded, with ASTM D2564 solvent cement, 2-step glue (clear primer and glue) is required.

2.4 COLD DOMESTIC WATER ABOVE GRADE

A. Copper Tube: 2-1/2-inches and smaller. ASTM B88 (ASTM B88M), Type L (B), Drawn.

1. Fittings: ASME B16.18 copper.

2. Joints: ASTM B32, alloy Sn95 solder.

B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B) for 2-1/2-inches and smaller, Type K (A) for 3-inches and larger, Drawn.

1. Fittings: Fittings are to be manufactured to copper tubing sizes, with grooves designed to accept grooved end couplings of the same manufacturer. Fittings are to be wrought copper, conforming to ASTM B75 alloy C12200 or ASTM B-152 alloy C11000 and ANSI B16.22.

2. Coupling: 2-inches to 8-inches for copper tubing consisting of ductile iron cast housings meeting ASTM A536, complete with a synthetic rubber gasket of a pressure-responsive design, with plated nuts and bolts to secure unit together. Couplings to be manufactured to connect copper tubing sized tube and fittings.

C. Cross-Linked Polyethylene Tubing - Type "A" - Engle Method - Fittings and Accessories (except exposed locations).

1. Tubing:

a. Cross-linked polyethylene (PEX) tubing complies with requirements of ASTM F876 and F877, and cross-linking method must be Type A (hot)method.

b. PEX tubing to have minimum working pressure of not less than 160 PSI for water at 73.4 degrees F, 100 PSI for water at 180 degrees F and 80 PSI for water at 200 degrees F determined in accordance with Plastic Pipe Institute Technical Report TR-3/92, and listed in Plastic Pipe Institute Technical Report TR-4/95.

c. Co-extruded – “colored piping” (blue/red) is not to be utilized.

2. Fittings:

a. Fittings: Engineered Plastic Fittings for above grade applications. Engineered plastic fittings for below grade applications. Serrated type with reinforcement rings.

b. Reinforcement Rings: Manufactured using "Engel Method" to ensure that viscoelastic stress regenerative properties are sufficient to produce pressure tight seal.

c. Fitting Insert: Of such dimension in that tubing must be expanded in order to facilitate insertion of fitting into tube.

d. Accomplish expansion of tubing and ring by an expansion tool designed expressly for that purpose.

e. Fittings complies with requirements of ASTM F877.

3. Manifolds: Provide premanufactured copper manifolds of same manufacturer as piping.

4. Stub-out Ells and Stub-out Brackets: Provide premanufactured Type L copper stub-out ells and copper stub-out brackets.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. General Installation:

1. Work performed by experienced journeyman plumbers. No exceptions.

2. Provide access panels for concealed valves, shock arrestors, trap primers and the like.

3. Install pipes and pipe fittings in accordance with recognized industry practices and manufacturer's recommendations.

4. Align piping accurately at connections, within 3/32-inch misalignment tolerance. Comply with ANSI B31 Code for Pressure Piping.

5. Locate piping runs, as indicated, vertically and horizontally (pitched to drain) and avoid diagonal runs wherever possible. Orient horizontal runs parallel with walls and column lines. Locate runs as shown or described by diagrams, details, and notations or, if not otherwise indicated, run piping in shortest route which does not obstruct space or block access for servicing building and its equipment. Hold piping close to walls, overhead construction, and other structural and permanent-enclosure elements of building. Limit clearance to 1/2-inch where furring is shown for enclosure or concealment of piping, but allow for insulation thickness, if any. Where possible, locate insulated piping for 1-inch clearance outside insulation. Whenever possible in finished and occupied spaces, conceal piping from view by locating it in column enclosures, hollow wall construction or

above suspended ceilings. Do not encase horizontal runs in solid partitions, except as indicated.

a. Do not run piping through transformer vaults, telephone, elevator, electrical or electronic equipment spaces or enclosures unless indicated on Drawings.

b. Concealed Piping Above Suspended Ceiling: Plan and coordinate to avoid interferences; install to maintain suspended ceiling heights shown on Architectural Drawings. Allow sufficient space above removable ceiling panels for panel removal. Locate piping so that valves are visible and accessible within 24-inches horizontally and vertically from point of access to the ceiling space. Provide plenum rated materials for ceiling spaces which are being used as plenums.

c. Exposed Work: Run pipes parallel to the closest wall unless otherwise shown on Drawings; maintain maximum headroom; avoid light fixtures.

d. Insulation Space Allowance: In piping work, allow space for pipe insulation and jackets. If interferences occur, move the piping to accommodate insulation thickness specified.

e. Pipe Lengths: Do not use short lengths or nipples at locations where a full length of pipe will fit.

f. Alignment Prior to Supporting and Anchoring: Place piping in proper alignment and position prior to connection to anchors, expansion loops, and equipment. Furnish jacking devices, temporary steel structural members, and assembled structures as necessary. Remove temporary equipment and structures supplied by contractor at completion; such items to remain Contractor property.

g. Valve and Equipment Connections: Piping not to place undue stress on flanged valves and equipment connections. Install mating flange faces true and parallel to each other and not requiring springing of piping for assembly. Pipe hangers and supports to carry the full weight of the pipe and fluid.

h. Piping Leaks: Correct immediately; use new materials; leak-sealing compounds or peening not permitted.

i. Pressure Ratings of Fittings, Valves, and Devices in Piping Systems: Pressure rating to be equal to, or greater than, the maximum working pressure of the system.

j. Equipment Vents and Drains: Provide for coils and vessels which contain water. Provide isolation valves and outlet valves at piping high and low points to permit venting and draining of the vessel without venting and draining connected piping. Provide hose connections and caps on drain lines.

k. Escutcheon Plates: Where exposed insulated and uninsulated piping passes through walls, floors or ceilings; provide spring clip type. Provide plates on both sides of wall or floor.

B. Testing:

1. General:

a. Provide temporary equipment for testing, including pumps, compressors, tanks, and gauges, as required. Test piping systems before insulation (if any) is installed and remove or disengage control devices before testing. Where necessary, test sections of each piping system independently, but do not use piping valves to isolate sections where test pressures exceed local valve operating pressure rating. Fill each section with water, compressed air, or nitrogen and pressurize for the indicated pressure and time.

b. Notify Architect and local Plumbing Inspector 2 days before tests.

c. Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.

d. Water Piping: Eliminate air from system. Fill and test at 125 PSIG or minimum 1-1/2 times static pressure at connection to serving utility main for period of two hours with no loss in pressure.

e. Send test results to Architect for review and approval and include in Operation and Maintenance Manual.

2. Testing of Pressurized Systems:

a. Test each pressurized piping system at 150 percent of operating pressure indicated, but not less than 125 PSIG test pressure.

b. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 2 percent of test pressure.

3. Test hot and cold domestic water piping systems upon completion of rough-in and before connection to fixtures at hydrostatic pressure of 125 PSIG.

C. Protection:

1. Keep pipe openings closed by means of plugs or caps to prevent entrance of foreign matter. Protect piping, ductwork, fixtures, equipment and apparatus against dirty water, chemical or mechanical damage both before and after installation. Restore to its original condition or replace fixtures, equipment or apparatus damaged prior to final acceptance of work.

D. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:

1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.

E. Cut piping squarely, free of rough edges and reamed to full bore. Insert piping fully into fittings.

F. Provide joints of type indicated in each piping system.

G. Thread pipe in accordance with ANSI/ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Remove excess cutting oil from piping prior to assembly. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.

H. Sleeves:

1. Pipe Sleeves:

a. Layout work in advance of pouring concrete, furnish, and set sleeves necessary to complete work.

b. Floor Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Extend sleeve 1-inch above finished floor. Caulk pipes passing through floor with non-shrinking grout or approved caulking compound (Except DWV Piping penetrating a concrete slab set on finish grade), provide "Link-Seal" sleeve sealing system for concrete/slab penetrations which are below grade. Caulk/seal piping passing through fire rated building assembly with UL rated assemblies. Provide fire-rated assemblies per local AHJ requirements

c. Wall Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Provide sleeve flush with finished face of wall. Caulk pipes passing through walls with non-shrinking caulking compound. Provide modular link sealing system for concrete penetrations which are below grade. Caulk/seal piping passing through fire-rated assemblies per local AHJ requirements.

d. Beam Sleeves: Coordinate with trades for locations of pipe sleeves in reinforced concrete and steel beams. Indicate penetrations on structural shop drawings. See Drawings and Specifications for specific sleeve location limitations. Plumbing Drawings are diagrammatic. Offset piping as required to meet these limitations. Pipe sleeve locations must be indicated on reinforced concrete and steel beam shop drawings. Field cutting of beams not allowed without written approval of structural engineer. No extra costs allowed for failure to coordinate beam penetrations prior to reinforced concrete and steel beam shop drawing submittal.

2. Installation of metallic or plastic piping penetrations through non fire-rated walls and partitions and through smoke-rated walls and partitions:

a. Install fabricated pipe sleeve.

b. After installation of sleeve and piping, tightly pack entire annular void between piping or piping insulation and sleeve identification.

c. Seal each end airtight with a resilient nonhardening seal per code.

3. Piping penetrations through fire-rated (1 to 3 hour) assemblies:

a. Select and install pre-engineered pipe penetration system in accordance with UL listing and manufacturer's recommendation.

b. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E84.

3.2 SANITARY, DRAINAGE (RAIN/STORMWATER) DWV PIPING, ABOVE GRADE

A. Drainage, Waste and Vent Piping: Test in accordance with governing plumbing code or as follows: Test drainage and venting systems, with necessary openings plugged, to permit system to be filled with water and subjected to water pressure of minimum of 5 PSI head. System to hold water without water level drop greater than 1/2 pipe diameter of largest nominal pipe size within 24-hour period. Test system in sections if minimum head cannot be maintained in each section. 5 PSI head to be minimum pressure at highest joint.

B. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:

1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.

C. Cast-Iron Joints: Comply with coupling manufacturer's Cast Iron Soil Pipe Institute Standards and installation instructions.

D. Sanitary and Storm Drainage:

1. Grade piping at a uniform pitch of 2 percent unless otherwise noted on Drawings.

2. Indirect Waste or Drain Piping: Extend piping to discharge as shown on Drawings. Maintain minimum air gap. Provide traps on indirect waste or drain piping exceeding 60-inches.

3. Drains:

a. Install drains to suit finished floor or roof surface. Install drains and components per manufacturer's instructions. Slope flooring to floor drain or sink a minimum of 1/2-inch below finished floor elevation.

4. Wall Access Panel: Secure to wall framing and install so that flange forms a close fitting joint with the finished wall surface.

3.3 COLD DOMESTIC WATER ABOVE GRADE

A. Water Piping: Eliminate air from system. Fill and test at 125 PSIG or minimum 1-1/2 times static pressure at connection to serving utility main for period of two hours with no loss in pressure.

B. Testing of Pressurized Systems:

1. Test each pressurized piping system at 150 percent of operating pressure indicated, but not less than 125 PSIG test pressure.

2. Observe each test section for leakage at end of test period. Test fails if leakage is observed or if pressure drop exceeds 2 percent of test pressure.

C. Test cold domestic water piping systems upon completion of rough-in and before connection to fixtures at hydrostatic pressure of 125 PSIG.

D. Firestopping Penetrations in Fire-Rated Wall/Floor Assemblies:

1. Provide proper sizing when providing sleeves or core-drilled holes to accommodate penetration. Firestop voids between sleeve or core-drilled hole and pipe passing through to meet requirements of ASTM E814.

E. Solder copper tube and fitting joints with lead free nickel/silver bearing solder meeting ASTM Std. B-32, in accordance with IAPMO Is 3-93, ASTM B-828 and Copper Development Association recommended procedures. Clean joints by other than chemical means prior to assembly. "Shock" cooling is prohibited. Fluxes to be water soluble for copper and brass potable water applications, and meeting CDA standard test method 1.0 and ASTM B813-91. Apply solder until a full fillet is present around the joint. Do not apply solder and flux in such excessive quantities as to run down interior of pipe. Lead solder or corrosion flux not to be present at the jobsite.

F. Braze copper tube and fitting socket with BCuP series filler metal without flux. Use listed brazing flux for joining of copper tube to brass or bronze fittings, meeting AWS FB3A or FB3C. "Shock" cooling is prohibited. A continuous fillet is to be visible around the completed joint. After cooling, thoroughly remove flux residue with warm water and a brush prior to testing. Do not use BCuP filler on copper alloys containing over 10 percent nickel. Cap or plug piping during construction to prevent entry of foreign material.

G. Domestic Water:

1. "Piping" to include pipes, fittings, nipples, valves and accessories connected thereto.

2. Run piping generally parallel to the axis of the building, arranged to conform to the building requirements and to suit the necessities of clearance for other mechanical ducts, flues, conduits and work of other trades, and as close to ceiling or other construction as practical, free of unnecessary traps or bends.

3. Grade water supply piping for complete drainage of the system. Install hose bibbs at low points.

4. Use unions for piping connections to equipment.

5. Provide sufficient elbows, swings and offsets to permit free expansion and contraction.

6. Use reducers or increasers. Use no bushings.

7. Ream or file each pipe to remove burrs. Inspect each length of pipe and each fitting for workmanship and clear passageways.

8. Cover, cap or otherwise protect open ends of piping during construction to prevent damage to threads or flanges and prevent entry of foreign matter. Disinfect and sterilize water supply piping as specified. Furnish written report on final water quality results.

9. Install exposed connections to equipment with special care, showing no tool marks or threads at fittings and piping. No bowed or bent piping permitted.

10. Make ferrous to non-ferrous connections with dielectric fittings.

11. Use extra heavy pipe for nipples, where unthreaded portion is less than 1-1/2-inches. Use no close nipples. Use only shoulder-type nipples.

12. Through-Wall Pipes: Type 'L' copper tubing for through-wall pipes which connect to exposed stops at wall surface. Anchor the pipes in the wall; attach pipe with U-bolts to steel back-up plates or steel angles anchored in the wall. Provide wrought copper elbow which securely anchors ears in wall at through-wall pipes.

13. Provide drain valves at base of risers and at low points on the system.

H. Sterilization of Domestic Water System:

1. General: Upon completion of tests and necessary replacements, thoroughly flush and disinfect domestic water piping.

2. Method: After thoroughly flushing system with water to remove sediment, fill system with a solution containing 50 parts per million of chlorine for not less than 24 hours or 200 parts per million of chlorine for not less than 3 hours. After retention, drain, reflush and return system to service.

3. Certification: Provide copy of domestic water chlorination certificate in each operations and maintenance manual.

4. Provide water line disinfections performed by a licensed contractor with training in potable water line disinfections.

END OF SECTION

Cal Poly Humboldt
Library Flat Roof Replacement

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Work Included:

1. Downspout Boot/Nozzle/Cover

2. Hose Bibbs

3. Roof/Overflow Drains

1.2 RELATED SECTIONS

A. Contents of Division 22, Plumbing and Division 01, General Requirements apply to this Section.

1.3 REFERENCES AND STANDARDS

A. References and Standards as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.4 SUBMITTALS

A. Submittals as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.5 QUALITY ASSURANCE

A. Quality assurance as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

1.6 WARRANTY

A. Warranty of materials and workmanship as required by Section 22 00 00, Plumbing Basic Requirements and Division 01, General Requirements.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. "Or approved equivalent" as defined in 22 00 00, Plumbing Basic Requirements. Substitution process requirements apply to approved equivalent products.

B. Downspout Boot/Nozzle/Cover:

1. JR Smith

2. Mifab

3. Sioux Chief
4. Zurn

C. Hose Bibbs:

1. Chicago
2. JR Smith
3. Mifab
4. Wade
5. Woodford
6. Zurn

D. Roof/Overflow Drains:

1. JR Smith
2. Mifab
3. Sioux Chief
4. Watts
5. Zurn

2.2 DOWNSPOUT BOOT/NOZZLE/COVER

A. See Schedule on Drawings for type.

2.3 HOSE BIBBS

A. See Schedule on Drawings for types.

2.4 ROOF/OVERFLOW DRAINS

A. See Schedule on Drawings for type.

B. Plastic components are not allowed.

PART 3 - EXECUTION

3.1 DOWNSPOUT BOOT/NOZZLE/COVER INSTALLATION

A. Install components in accordance with manufacturer's instructions and approved product data submittals.

B. Set plumb, level and rigid.

3.2 HOSE BIBB INSTALLATION

A. Install components in accordance with manufacturer's instructions and approved product data submittals.

B. Set plumb, level and rigid.

3.3 ROOF/OVERFLOW DRAINS INSTALLATION

A. Install components in accordance with manufacturer's instructions and approved product data submittals.

B. Set plumb, level and rigid.

END OF SECTION

Photovoltaic Coordination Study

Humboldt State University (Cal Poly Humboldt) - Library Roof Replacement
2022-1152

Prepared for:

Suarez-Kuehne Architecture

Prepared by:

Wesley Lau, PE, LEED AP

November 11, 2022

Table of Contents

INTERFACE ENGINEERING

SCOPE

Interface conducted a feasibility study of the Library at Humboldt State University (Cal Poly Humboldt) for the potential of providing a solar photovoltaic system on the roof. Interface has provided a description of the PV system, a preliminary array layout, and evaluation of the electrical interconnection.

DESCRIPTION OF PV SYSTEM

System Description

The following is a description of the proposed solar PV equipment. Note that the exact system size will depend on the final equipment selected by the PV contractor.

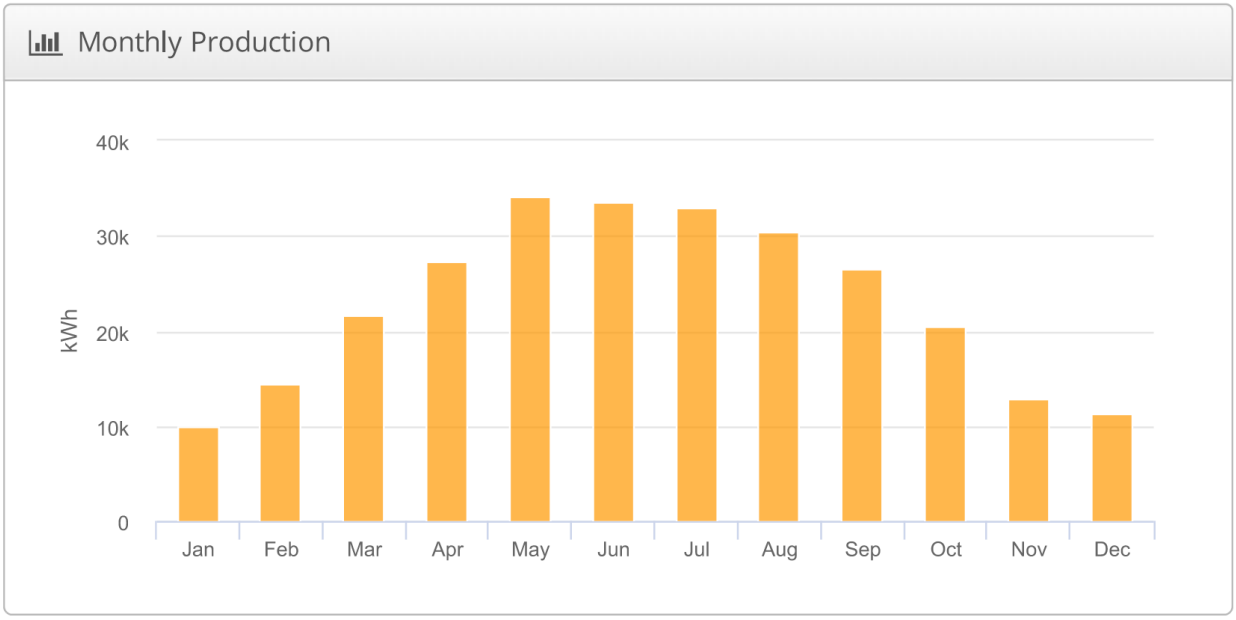
Peak Power	200.2 kW DC*
Plant Type	Monocrystalline fixed tilt roof mount, 10° tilt, 170° azimuth
Panel Count	(556 @ 360W) Sunpower SPR-X22-360-COM
Inverter Power	168.4 kW AC
Inverter Type	(7) Sunny Tripower 24000TL-US (SMA)

*Note: Refer to the "Electrical Interconnection" section where the peak power may be limited by the available amperage for interconnection.

Estimated Production

The following is a summary of the estimated production of the system.

Expected Annual Production	275,603 kWh



ARRAY LAYOUT

Interface evaluated the roof area and shading from nearby equipment and structures and created a preliminary array layout. This layout takes into account the following key factors:

- Interrow spacing to avoid self-shading between 9am-3pm (2.5')
- Minimum 8' setback from the roof edge
- Shading from the mechanical penthouse (the height of this penthouse was estimated and has not been precisely measured)
- Shading from the large trees to the south (the height and shading of the trees was estimated and has not been precisely measured)
- Shading from rooftop equipment (the height of the rooftop equipment was estimated and has not been precisely measured)
- No panels in proposed walkpad areas
- No panels over proposed roof drains locations

Note that a detailed shading study shall be conducted by the PV contractor based on final panel selection, racking, and rooftop equipment in place at the time of installation.

ELECTRICAL INTERCONNECTION

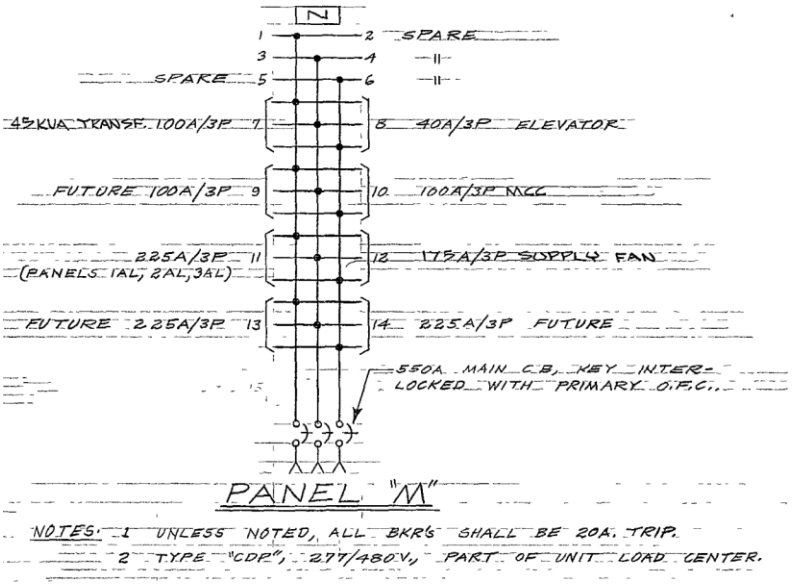
All information in this section is based on available as-builts. The PV contractor shall be responsible for verifying all information in the field.

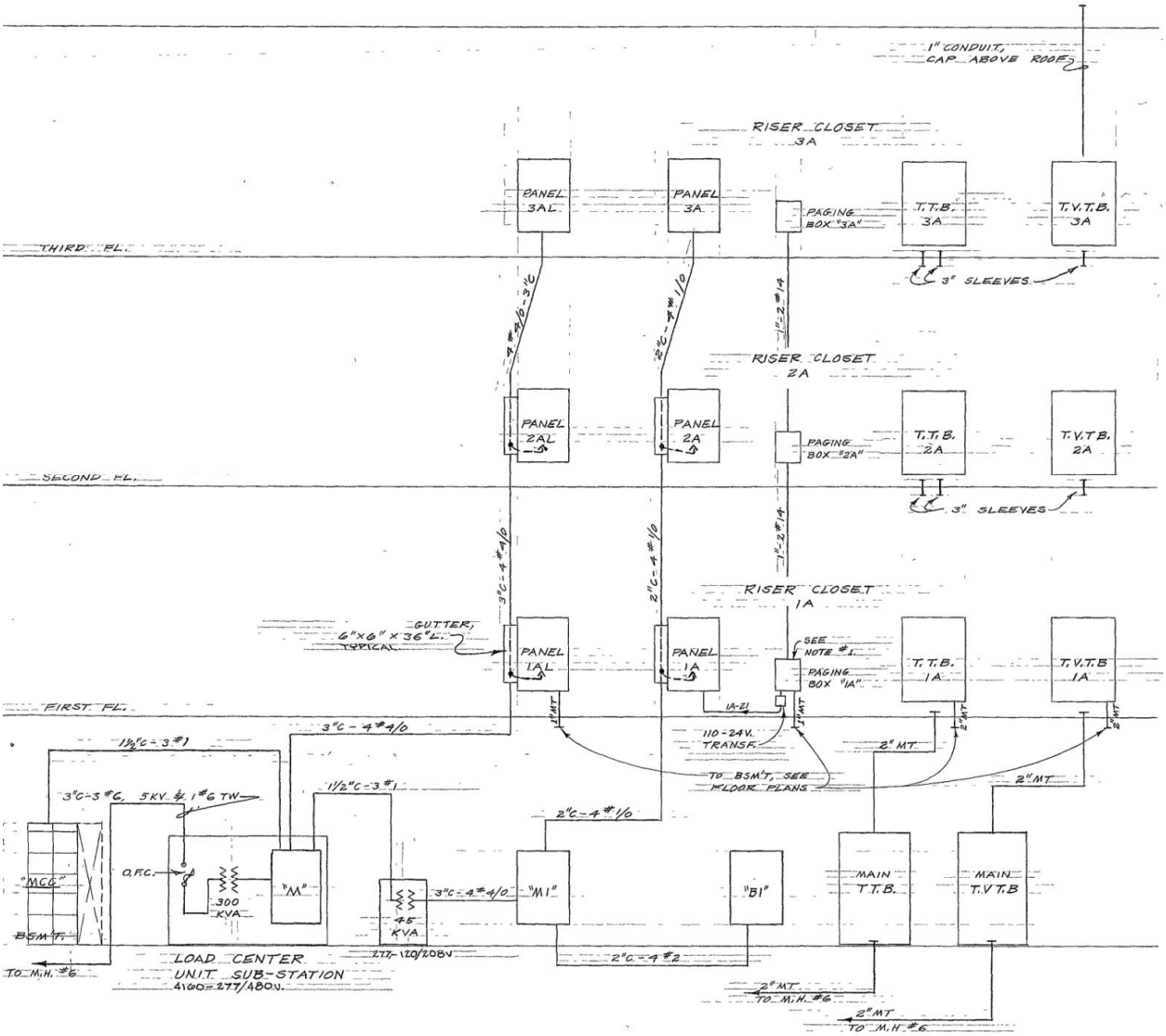
The existing electrical service consists of a 300 kVA Unit Substation located in the Transformer Room in the Basement. The Unit Substation contains 'Panel M' which is rated at 277/480V, 3 phase, 4 wire and has a 550A main circuit breaker. The bus rating of 'Panel M' is unknown, but it is likely that the rating is a minimum of 600A. There appears to be a space for a new 3 pole breaker at the opposite end of the main circuit breaker.

The proposed inverter output current is rated at 203A. The sum of 125% of the inverter output current (253A) and the 'Panel M' main circuit breaker (550A) exceeds 120% of the panel busbars (720A). This installation is not compliant with CEC 705.12. Therefore, the following options are available for a PV interconnection:

1) Provide a line side tap between the 300 kVA transformer and 'Panel M'.
2) Upgrade 'Panel M' to have an 800A bus.
3) Limit the inverter output current to 136A. This would result in a maximum array size of approximately 150 kW DC.

Refer to the following diagrams from the electrical as-builts for additional information.





ONE-LINE RISER DIAGRAM

NO SCALE.

NOTES: 1. PAGING BOXES SHALL BE 8"W. X 10"H. X 3"D WITH PLYWOOD MOUNTING BOARD AND ONE KULKA #602-10 TERMINAL STRIPS.

APPENDIX A – Helioscope Report

Conservative Layout HSU Library, 1 Harpst St, Arcata, CA 95521

Report

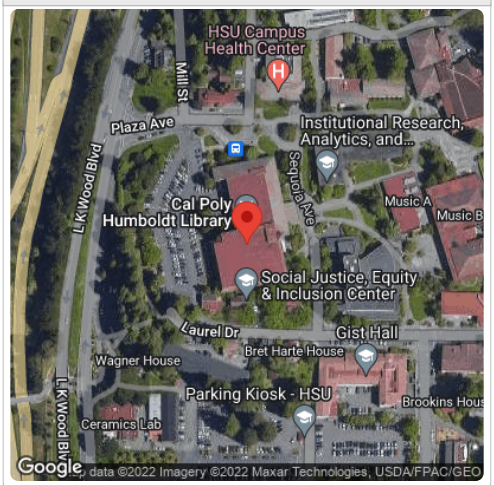
Project Name	HSU Library
Project Address	1 Harpst St, Arcata, CA 95521
Prepared By	Joe Schmid joes@interfaceeng.com

INTERFACE ENGINEERING

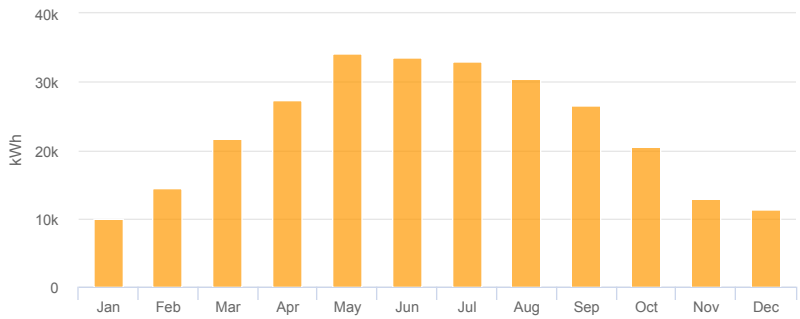
System Metrics

Design	Conservative Layout
Module DC Nameplate	200.2 kW
Inverter AC Nameplate	168.4 kW Load Ratio: 1.19
Annual Production	275.6 MWh
Performance Ratio	86.4%
kWh/kWp	1,376.9
Weather Dataset	TMY, 10km grid (40.85,-124.05), NREL (prospector)
Simulator Version	a6f22c3833-f7088ad559-63a99a282b-531d0d1c0a

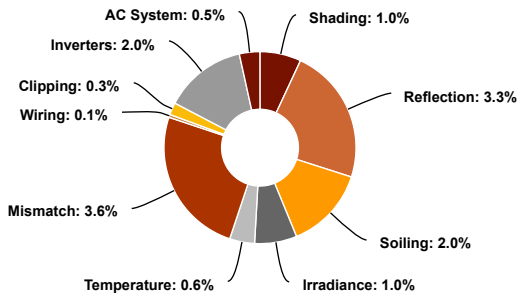
Project Location



Monthly Production



Sources of System Loss



Annual Production

	Description	Output	% Delta
Irradiance (kWh/m²)	Annual Global Horizontal Irradiance	1,481.4	
	POA Irradiance	1,594.0	7.6%
	Shaded Irradiance	1,578.0	-1.0%
	Irradiance after Reflection	1,525.6	-3.3%
	Irradiance after Soiling	1,495.1	-2.0%
	Total Collector Irradiance	**1,495.1**	**0.0%**
Energy (kWh)	Nameplate	299,190.8	
	Output at Irradiance Levels	296,117.4	-1.0%
	Output at Cell Temperature Derate	294,320.8	-0.6%
	Output After Mismatch	283,684.7	-3.6%
	Optimal DC Output	283,486.8	-0.1%
	Constrained DC Output	282,646.6	-0.3%
	Inverter Output	276,987.6	-2.0%
	Energy to Grid	**275,602.7**	**-0.5%**
Temperature Metrics			
	Avg. Operating Ambient Temp		12.0 °C
	Avg. Operating Cell Temp		20.1 °C
Simulation Metrics			
	Operating Hours		4659
	Solved Hours		4659

Condition Set

Description	Condition Set 1											
Weather Dataset	TMY, 10km grid (40.85,-124.05), NREL (prospector)											
Solar Angle Location	Meteo Lat/Lng											
Transposition Model	Perez Model											
Temperature Model	Sandia Model											
Temperature Model Parameters	Rack Type	a	b	Temperature Delta								
	Fixed Tilt	-3.56	-0.075	3°C								
	Flush Mount	-2.81	-0.0455	0°C								
Soiling (%)	J	F	M	A	M	J	J	A	S	O	N	D
	2	2	2	2	2	2	2	2	2	2	2	2
Irradiation Variance	5%											
Cell Temperature Spread	4° C											
Module Binning Range	-2.5% to 2.5%											
AC System Derate	0.50%											
Module Characterizations	Module	Uploaded By	Characterization									
	SPR-X22-360 (SunPower)	HelioScope	Sunpower_SPR_X22_360.PAN, PAN									
Component Characterizations	Device	Uploaded By	Characterization									
	Sunny Tripower 24000TL-US (SMA)	HelioScope	Modified CEC									

Components

Component	Name	Count
Inverters	Sunny Tripower 24000TL-US (SMA)	7 (168.4 kW)
Strings	10 AWG (Copper)	49 (3,990.4 ft)
Module	SunPower, SPR-X22-360 (360W)	556 (200.2 kW)

Wiring Zones

Description	Combiner Poles	String Size	Stringing Strategy
Wiring Zone	-	3-13	Along Racking

Field Segments

Description	Racking	Orientation	Tilt	Azimuth	Intrarow Spacing	Frame Size	Frames	Modules	Power
Field Segment 1	Fixed Tilt	Landscape (Horizontal)	10°	168.76071°	2.5 ft	1x1	556	556	200.2 kW

Detailed Layout

APPENDIX B – Product Data Sheets

SunPower® X-Series Commercial Solar Panels | X22-360-COM

More than 22% Efficiency

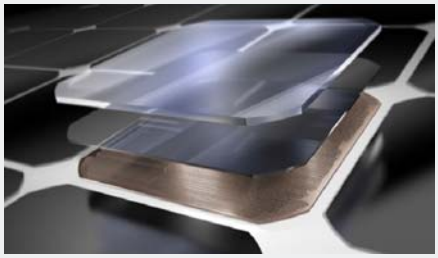
Captures more sunlight and generates more power than conventional panels.

Maximum Performance

Designed to perform in demanding real-world conditions of high temperatures, partial shade from overhead wires, and low light.[1]

Commercial Grade

Intended for commercial sites where maximum energy production is critical.



Maxeon® Solar Cells: Fundamentally better
Engineered for performance, designed for reliability.

Engineered for Peace of Mind

Designed to deliver consistent, trouble-free energy over a very long lifetime.[3]

Designed for Reliability

The SunPower Maxeon solar cell is the only cell built on a solid metal foundation. Virtually impervious to the corrosion and cracking that degrade conventional panels.

Same excellent durability as E-Series panels. #1 Rank in Fraunhofer durability test.[4]

High Performance & Excellent Reliability

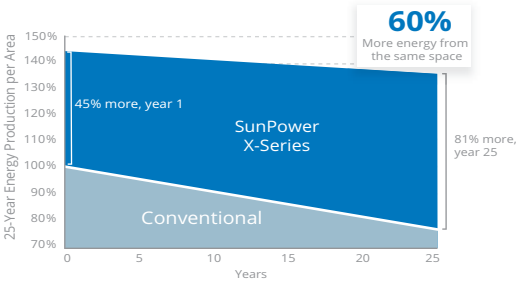
X22 SERIES

SPR-X22-360-COM

Highest Efficiency Available[2]

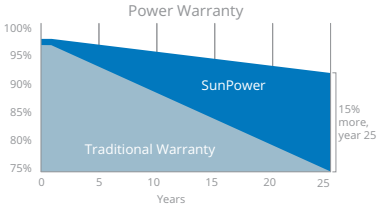
Generate more energy per square foot

More energy to power your operations. X-Series commercial systems convert more sunlight to electricity by producing 45% more energy in the first year. This advantage increases over time, producing 60% more energy over the first 25 years to meet your needs. [1]

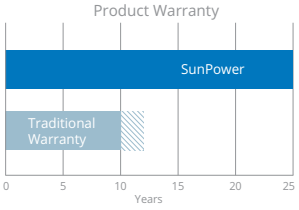


Best Reliability, Best Warranty

A better warranty starts with a better product. Proven performance backs up our industry-best coverage, including out warranted 0.25% per year degradation rate. [5]



More guaranteed power: 98% for first year, –0.25%/yr. to year 25



Combined Power and Product defect 25-year coverage

SUNPOWER®

SunPower® X-Series Commercial Solar Panels | X22-360-COM

Electrical Data	
	SPR-X22-360-COM
Nominal Power (Pnom)[6]	360 W
Power Tolerance	+5/–3%
Avg. Panel Efficiency[7]	22.2%
Rated Voltage (Vmpp)	59.1 V
Rated Current (Impp)	6.09 A
Open-Circuit Voltage (Voc)	69.5 V
Short-Circuit Current (Isc)	6.48 A
Max. System Voltage	1000 V UL & 1000 V IEC
Maximum Series Fuse	15 A
Power Temp Coef.	–0.29% / ° C
Voltage Temp Coef.	–167.4 mV / ° C
Current Temp Coef.	2.9 mA / ° C

Operating Condition And Mechanical Data	
Temperature	–40° F to +185° F (–40° C to +85° C)
Impact Resistance	1 inch (25 mm) diameter hail at 52 mph (23 m/s)
Appearance	Class B
Solar Cells	96 Monocrystalline Maxeon Gen III
Tempered Glass	High-transmission tempered anti-reflective
Junction Box	IP-65, MC4 compatible
Weight	41 lbs (18.6 kg)
Max. Load	Wind: 50 psf, 2400 Pa front & back Snow: 112 psf, 5400 Pa front
Frame	Class 2 silver anodized; stacking pins

Tests And Certifications	
Standard Tests[8]	UL1703 (Type 2 Fire Rating), IEC 61215, IEC 61730
Management System Certs	ISO 9001:2015, ISO 14001:2015
EHS Compliance	RoHS, OHSAS 18001:2007, lead free, REACH SVHC-163, PV Cycle
Sustainability	Cradle to Cradle Certified™ Silver (contributes to LEED categories)[9]
Ammonia Test	IEC 62716
Desert Test	10.1109/PVSC.2013.6744437
Salt Spray Test	IEC 61701 (maximum severity)
PID Test	1000V: IEC62804, PVEL 600hr duration
Available Listings	UL, TUV, CEC

REFERENCES:

1 SunPower 360W compared to a Conventional Panel on same sized arrays (260W, 16% efficient, approx. 1.6 m2), 4% more energy per watt (based on 3pty module characterization and PVSim), 0.75%/yr slower degradation (Campeau, Z. et al. "SunPower Module Degradation Rate," SunPower white paper, 2013).

2 Based on search of datasheet values from websites of top 10 manufacturers per IHS, as of January 2017.

3 "SunPower Module 40-Year Useful Life" SunPower white paper, May 2015. Useful life is 99 out of 100 panels operating at more than 70% of rated power.

4 X-Series same as E-Series, 5 of top 8 panel manufacturers tested in 2013 report, 3 additional panels in 2014. Ferrara, C., et al. "Fraunhofer PV Durability Initiative for Solar Modules: Part 2". Photovoltaics International, 2014.

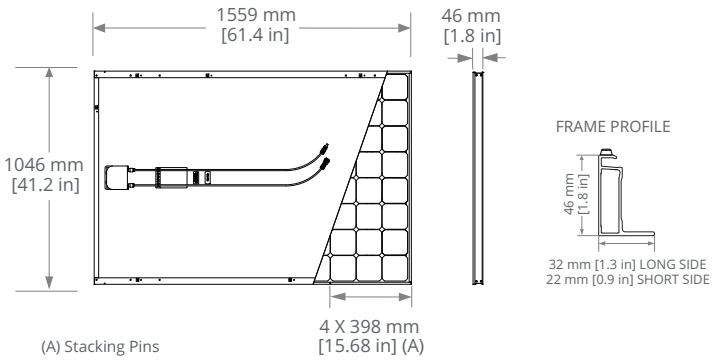
5 See us.sunpower.com/commercial-solar/products/panel-warranty for more details.

6 Standard Test Conditions (1000 W/m² irradiance, AM 1.5, 25° C). NREL calibration Standard: SOMS current, LACCS FF and Voltage.

7 Based on average of measured power values during production.

8 Type 2 fire rating per UL1703:2013, Class C fire rating per UL1703:2002.

9 See salesperson for details.



Please read the safety and installation guide.

SUNPOWER®

Thornton Tomasetti

Via email: johns@skarch.com

October 13, 2022

Mr. John Suarez
Partner
SUAREZ-KUEHNE ARCHITECTURE
2410 14th Avenue
San Francisco, CA 94116

RE: CAL POLY HUMBOLDT - LIBRARY REROOFING PROJECT
STRUCTURAL EVALUATION OF ROOFTOP SOLAR
TT Project No. U22103.00

Dear John:

As part of the Cal Poly Humboldt Library Reroofing Project, Thornton Tomasetti (TT) understands that the University is considering implementation of photovoltaic (PV, or solar) panels installed on the roof. TT is submitting this letter as a means of communicating the structural feasibility of the proposed solar installation, and specifically the adequacy of the existing building structure to support said solar panels.

The primary structural consideration for a solar panel installation is the weight of the solar panel system, both in terms of the existing roof structure's ability to support the weight (i.e. gravity load consideration), and in terms of increased seismic forces on the structure overall (i.e. seismic load considerations). Each consideration is addressed separately below.

In terms of gravity loading…if the solar panels are laid generally flat (parallel to the roof) and low (less than 18" above the roof), then their weight can be considered offset by the design roof live load that the existing structure was originally designed for (i.e. 20psf). Thus, if PV system weighs less than 20psf, then gravity load capacity of the existing roof structure will not be impacted.

In terms of seismic load…the 2019 (and 2021) California Existing Building Code defines conditions under which a building modification project would trigger a mandatory seismic evaluation (and potential retrofit) of the entire structure. The applicable trigger related to rooftop

Thornton Tomasetti

Mr. John Suarez
RE: CAL POLY HUMBOLDT - LIBRARY REROOFING PROJECT
STRUCTURAL EVALUATION OF ROOFTOP SOLAR
TT Project No. U22103.00

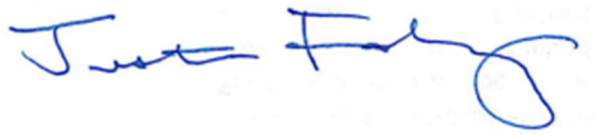
solar is the increase of the weight of a floor/roof by more than 10%. To avoid this seismic trigger, the solar panels should be limited in weight to less than 12psf (10% of total existing roof weight of 120psf, including concrete slab, etc.), as an average over the entire roof area.

In summary, the proposed rooftop solar project is structurally acceptable, provided the weight of the system is limited to 20psf locally (at footprint of the panel array), and 12psf globally (averaged over the roof area). Anchored PV systems can be expected to be well below this weight limit. Ballasted PV systems have higher weights, but are likely to be below these limits as well. The solar design engineer shall verify the system weight against the limits noted in this letter.

We trust this information is useful in planning/designing the solar project. Please contact us if any questions.

Very truly yours,

THORNTON TOMASETTI, INC.



Justin D. Fahey, SE#4833
Associate Principal