UCDAVIS HEALTH
4800 Second Ave
FSSB Suite 3010
Sacramento, CA 95817

UCDAVIS HEALTH | Facilities Design and Construction
Building Department

Final Report - Approved

Application Number: B24-0022

Report Date: 05/10/2024
Description :
Address : 2825 50th St, SACRAMENTO, CA, 95817
Record Type : UCDH Building
Document Filename : Specs_9557420_Mind Roof Replacement_Bldg 25_BC1.pdf

Reviewer Contact Information:

Reviewer Name	Reviewer Email	Reviewer Phone
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William Gilliland	wgilliland@ucdavis.edu	-

General Comments

Markups for this Approved Document or Plan

UCDAVIS HEALTH

SPECIFICATIONS

PROJECT NO. 9557420
MIND/MIND LAB ROOF REPAIR / REPLACE (Bldg. 25)

FACILITIES DESIGN AND CONSTRUCTION
4800 2ND AVENUE, SUITE 3010
SACRAMENTO, CA 95817
916-734-7024
HEALTH.UCDAVIS.EDU/FACILITIES

August 2023

UC DAVIS HEALTH BUILDING DEPARTMENT

APPROVED

REVIEWED FOR CODE COMPLIANCE
The set of plans and specifications must be kept on the job site at all times and it is unlawful to make any changes or alterations to the approved set without written permission from the Building Department.
The approval of this plan and specifications SHALL NOT be held to permit or approve the violation of any University Policy or State Building Code.

BY: Paul R. Menard AIA CBO DATE: 05/09/2024

PROJECT #: B24-0022

UC Davis Health
Sacramento, CA 95817

This approval includes 289 pages.

OFFICE OF THE STATE FIRE MARSHAL
APPROVED FIRE AND PANIC ONLY

William Gilliland
for
UCDH Lead DCFM
DATE: 05/10/2024

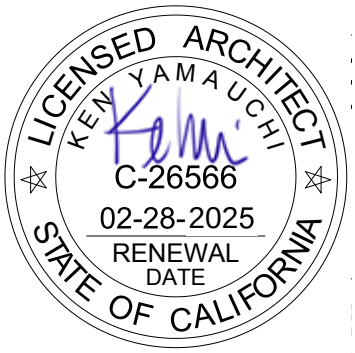
Approval of this plan does not authorize or approve any omission or deviation from applicable regulations. Final approval is subject to field inspection. One set of approved plans shall be available on the project site at all times.

SIGNATURE SHEET

ARCHITECT

Ken Yamauchi
Hibser Yamauchi Architects, Inc
4602 2nd Street, Suite 3
Davis, CA 95618
530-758-1270

DESIGN PROFESSIONAL'S STAMP



DIVISION 1 – GENERAL REQUIREMENTS
TABLE OF CONTENTS

SECTION NO.	TITLE	PAGES
011100	Summary of the Work	5
011400	Work Restriction	4
012500	Clarification/Information Procedures	4
012550	Contract Modification Procedures	6
012900	Measurement and Payment	6
013100	Coordination	13
013200	Contract Schedules	11
013300	Shop Drawings, Product Data and Samples	6
013400	Contractor(s) Emergency Procedures	2
013500	Special Procedures	10
014100	Regulatory Requirements	5
014200	References	8
014500	Quality Control	7
014550	Inspection and Testing of Work	11
015200	Construction Facilities	3
015500	Vehicular Access and Parking	3
015600	Temporary Barriers, Enclosures and Controls	8
015610	Airborne Contaminants Control	52
016100	Product Requirements	10
017300	Cutting and Patching	7
017400	Cleaning	4
017600	Protecting of Existing and Installed Construction	4
017700	Closeout Procedures	6
017800	Closeout Submittals	14
019110	Building Envelope Commissioning	7

DIVISION 2 – SITEWORK

SECTION NO.	TITLE	
02070	Selective Demolition	2

DIVISION 3 – CONCRETE

SECTION NO.	TITLE	
	NOT USED	-

DIVISION 4 – MASONRY

SECTION NO.	TITLE	
	NOT USED	-

DIVISION 5 – METALS

SECTION NO.	TITLE	
05500	Miscellaneous Metal Fabrications	7

DIVISION 6 – CARPENTRY

SECTION NO.	TITLE	
	NOT USED	-

DIVISION 7 – THERMAL AND MOISTURE PROTECTION

SECTION NO.	TITLE	
070500	Membrane Roofing.	4
07600	Flashing and Sheet Metal	5

07920 Caulking and Sealants 3
070150.19 Preparation for Re-Roofing 7
075416 KEE Roofing 10

DIVISION 8 – DOORS AND WINDOWS

SECTION NO. TITLE
086300 Metal Framed Skylights 5
08710 Finish Hardware 7
088000 Glazing 5

DIVISION 9 – FINISHES

SECTION NO. TITLE
09900 Painting 11

DIVISION 10 – SPECIALTIES

SECTION NO. TITLE
NOT USED ..... -

DIVISION 11 – EQUIPMENT

SECTION NO. TITLE
NOT USED ..... -

DIVISION 12 – FURNISHINGS

SECTION NO. TITLE
NOT USED ..... -

DIVISION 13 – SPECIAL CONSTRUCTION

SECTION NO. TITLE
NOT USED ..... -

DIVISION 14 – CONVEYING SYSTEMS

SECTION NO. TITLE
NOT USED ..... -

DIVISION 15 – MECHANICAL WORK

SECTION NO. TITLE
NOT USED ..... -

DIVISION 22 – PLUMBING

SECTION NO. TITLE
NOT USED ..... -

DIVISION 23 – MECHANICAL WORKS

SECTION NO. TITLE
NOT USED ..... -

DIVISION 26 – ELECTRICAL WORK

SECTION NO. TITLE
NOT USED ..... -

DIVISION 27 – COMMUNICATION WORK
SECTION NO. TITLE
NOT USED ..... -

DIVISION 31 – EARTH MOVING
SECTION NO. TITLE
NOT USED ..... -

DIVISION 32 – EXTERIOR IMPROVEMENTS
SECTION NO. TITLE
NOT USED ..... -

DIVISION 33 – SITE UTILITIES
SECTION NO. TITLE
NOT USED ..... -

END OF TOC

SECTION 01 11 00

SUMMARY OF THE WORK

PART I - GENERAL

1.01 SECTION INCLUDES

A. Description of the Work

B. **Contractor** Warrants

C. Contract Document Intent and Relationships

D. University Furnished/**Contractor** Installed Products

E. University Furnished/University Installed Products

F. Concurrent Work Under Separate Contracts

G. Site Condition Survey and Protection of Existing Improvements

H. **Contractor** Use of Site and Premises

I. University Beneficial Occupancy (if applicable)

J. Project Phasing (if applicable)

1.02 DESCRIPTION OF THE WORK

A. Project is titled: MIND/MIND LAB ROOF REPAIR/REPLACE

B. University Project No.: 9557420

C. Project is located at 2805 – 2825 50th Street, UC Davis Health, Sacramento, California, as shown on the vicinity map.

D. Project is Replacing existing roofing and skylights.

E. A description of areas, types of construction and general nature of the Work are described on drawing (A0.01).

F. Special Constraints and Criteria:

1. Refer to Section 011400 Work Restrictions for dates and hours when the building is occupied and operational, and work-shift hour requirements and restrictions.

2. Noise Mitigation shall be required when the building is occupied.

3. Egress shall not be restricted or impacted unless scheduled when the building is not occupied.

1.03 **CONTRACTOR** WARRANTS

A. **Contractor** warrants that it is skilled and experienced in the use and interpretation of Contract Documents such as those included in the bid documents for this Contract. The **Contractor** further warrants that it has carefully reviewed the Contract Documents for this Work and has found them to be free of ambiguities and sufficient for bid purposes.

B. **Contractor** warrants that it has inspected the Project Site and based on these observations, has satisfied itself as to the nature and location of the Work; and any special conditions likely to be encountered at the site which may affect the performance of the Work.

C. **Contractor** warrants that its bid is based solely on the Contract Documents provided, its own observations, and written explanations and interpretations obtained from University's Representative and not on any explanation or interpretation, oral or written, from any other source.

1.04 CONTRACT DOCUMENT INTENT AND RELATIONSHIPS

A. Contract Documents Intent: Provide all labor, material, equipment, tools, transportation, insurance, services, and all other requirements necessary to construct the project described in the Contract Documents.

B. Relationship of Contract Documents: Drawings, Specifications and other Contract Documents in the Contract 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. For example, the drawings may not show every variation of an anchor clip that is required to support a curtain wall from its structural support; it can be reasonably inferred that variations of or additions to these clips are necessary to complete the installation of the working system and therefore all such clips are understood to be included in the Work.

C. Discrepancies in Contract Documents: In the event of error, omission, ambiguity, or conflict in the Contract Documents, **Contractor** shall bring the matter to University's Representative's attention in a timely manner, for University's Consultant's determination and direction in accordance with provisions of the General Conditions of the Contract.

D. Bidding and Contract requirements: Information for bidding, Conditions of the Contract and other Contract documents will be produced by University and may be included in the Contract Documents for convenience. Such documents are not Specifications. Specifications are found in Divisions 1 through 48 of the Contract, as listed in the Table of Contents of the Contract.

E. Contract Drawings: The Drawings provided with and identified in the Contract are the Drawings referenced in the Agreement.

1. Drawings produced for this project may encompass Civil, Landscape, Architectural, Structural, HVAC, Plumbing, Piping, Fire Protection, and Electrical portions of the Work. Interior Design drawings may also be provided for product selection and installation information.

2. The location, extent and configuration of the required construction and improvements are shown and noted on the Drawings. A list of Drawings is included in the Contract Documents.

3. Drawings are arranged according to design discipline. Such organization and all references to trades, subcontractor, specialty contractor or supplier shall not control the **Contractor** in dividing the work among subcontractors or in establishing the extent of the work to be performed by any trade.

4. Where the terms "as shown", "as indicated", "as noted", "as detailed", "as scheduled" or terms of like meaning, are used in the Drawings or Specifications, it shall be understood that reference is being made to the List of Drawings and the Specifications as bound in the Contract Documents.

5. Where reference to the word "plans" is made anywhere in the Drawings, Specifications and related Contract Documents, it shall be understood to mean the Drawings listed in the List of Drawings.

F. Contract Specifications: The Specifications provided as a part of the Contract Documents are the Specifications referenced in the Agreement.

1. The Specifications are organized by Division and Sections in accordance with recommended practice of the Construction Specifications Institute. Such organization shall not control the **Contractor** in dividing the work among

subcontractors or in establishing the extent of the work to be performed by any trade.

2. Specifications are included in the Contract, which also includes other Bidding and Contract Documents. Contents of the Contract are listed in the TABLE OF CONTENTS.

3. Information for bidding, Conditions of the Contract and other Contract documents will be produced by University. Such documents are not Specifications. Specifications are found in Division 1 through 48 of the Contract.

1.05 UNIVERSITY-FURNISHED, CONTRACTOR-INSTALLED (UFCI) PRODUCTS

A. University-Furnished Products: University will furnish, for installation by **Contractor**, products which may be identified on the Drawing and in the Specifications as UFCI (University-Furnished/**Contractor**-Installed).

B. Relationship to Work Under the Contract: Work under the Contract shall include all provisions necessary to fully incorporate such products into the Work, including, as necessary but not limited to: fasteners, backing, supports, piping, conduit, conductors, and other such provisions from point of service to point of connection, and field finishing, as shown on the Drawings and/or Specified herein. See Section 013100 - COORDINATION for additional requirements.

1.06 UNIVERSITY-FURNISHED, UNIVERSITY-INSTALLED (UFUI) PRODUCTS – **NOT USED**

1.07 CONCURRENT WORK UNDER SEPARATE CONTRACTS – **NOT USED**

1.08 SITE CONDITION SURVEY & PROTECTION OF EXISTING IMPROVEMENTS

A. Site Condition Survey: Prior to commencing work, the **Contractor**, University's Representative and other University representatives shall tour the Project site together to examine and record the existing condition of site, adjacent buildings, and improvements. This record shall serve as a basis for determination of damage (if any) due to the construction process. The record shall be signed by all parties participating in the tour.

B. Protection of Existing Improvements: Locate all known existing utilities prior to proceeding with construction. Existing utilities shall be kept in service where possible and protected by the **Contractor** from damage. If any structure or utility is damaged, take immediate action to ensure the safety of persons and University property and effect repair. If previously undiscovered structures or utilities are encountered, request University's Representative to provide direction on how to proceed with the work. Cracks, sags or

damage to adjacent structures or improvements not noted in the original survey shall be reported to University's Representative.

C. University does not normally charge for its shutdown support services. However, if poor planning or execution of a shutdown by **Contractor** causes excessive time and effort for University, University reserves the right to back charge **Contractor** for additional work.

1.09 CONTRACTOR USE OF SITE AND PREMISES

A. Site Access: Limit access to site as indicated on the drawings. If routes and access points are not indicated, access shall be as directed or approved by University's Representative.

B. Hours of Operation: Construction activities are limited to the hours of 7:00 a.m. to 5:00 p.m., Monday through Friday. Prior University approval is required for **Contractor** construction work at any other time or day.

1.10 UNIVERSITY BENEFICIAL OCCUPANCY – **NOT USED**

1.11 PROJECT PHASING – **NOT USED**

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not applicable to this Section

END OF SECTION 01 11 00

SECTION 01 14 00

WORK RESTRICTIONS

PART I - GENERAL

1.01 WORK HOURS

A. No Work shall be done outside of standard Monday through Friday 7:00 a.m. to 5:00 p.m. working hours, on holidays or weekends unless prior written approval has been retained from the University's Representative.

1.02 ROJECT PHASING (NOT USED)

1.03 WORK SEQUENCE and WORK RESTRICTIONS (NOT USED)

1.04 **CONTRACTOR**'S USE OF PROJECT SITE

A. **CONTRACTOR**'s use of the Project site for the Work and storage is restricted to the areas designated on the Drawings.

1.05 UNIVERSITY OCCUPANCY (NOT USED)

1.06 SUBSTANTIAL COMPLETION

A. Substantial Completion shall be applicable to the entire Work.

1.07 PROTECTION OF PERSONNEL

A. Patients, University of California Davis (UCD) personnel and Students, will be occupying parts of the adjacent buildings during the construction period. **CONTRACTOR** shall take proper precautions to ensure the safety of all persons during the construction period.

1.08 WORK SITE DECORUM

A. Extreme care to limit noise shall be taken at all times that the building is occupied. Loud or unnecessary conversation shall be avoided. The playing of radios, or any audio devices shall be strictly prohibited. Noise, that in the sole opinion of the University's Representative, is disturbing or disruptive to occupants of the building shall be scheduled for periods when the building is not occupied.

B. **CONTRACTOR** shall control the conduct of its employees so as to prevent unwanted interaction initiated by **CONTRACTOR**'s employees with UCD staff, patients, students or other individuals, adjacent to the Project site. Without limitation, unwanted interaction by **CONTRACTOR**'s employees includes whistling at or initiating conversations with passersby. In the event that any **CONTRACTOR**'s employee initiates such unwanted interaction, or utilizes profanity, **CONTRACTOR** shall, either upon request of University's Representative or on its own initiative, replace said employee with another of equivalent technical skill, at no additional cost to the University.

C. SMOKE AND TOBACCO-FREE ENVIRONMENT: The University of California Davis is committed to a healthy campus and workplace culture and environment. Effective January 2, 2014, the University of California Davis is a Smoke and Tobacco-Free environment. Smoking and the use of smokeless tobacco products (e.g., e-cigarettes and other unregulated nicotine products) is strictly prohibited on all University of California Davis-controlled properties, owned or leased and regardless of location. This policy is intended to provide a healthier, safer, and productive work and learning environment for the entire University of California Davis community. For more information on the Smoke/Tobacco-Free Policy, please visit (http://breathefree.ucdavis.edu). For more information on the President's Mandate and other related resources, please visit http://uctobaccofree.com/.

D. Alcoholic beverages are prohibited on the University's Project site.

1.09 INTERRUPTION OF BUILDING SERVICES

A. Planned utility service shutdowns shall be accomplished during periods of minimum usage. In some cases, this will require Work activities before 8:00 a.m. and after 5:00 p.m. and weekend Work, at no additional cost to the University. At least 14 calendar days advance notice shall be given to the University's Representative before interruptions to utility service (refer to Utility Service Interruption/Shut Down Request) and other interferences with use of existing buildings, surrounding hardscape and roads.

B. Shutdowns critical to the completion of the project shall be listed as Milestones on the project schedule. The **CONTRACTOR** shall program. Work so that service will be restored in the minimum possible time and shall cooperate with the University in reducing shutdowns of utility systems.

C. The University reserves the right to deny shutdown requests based on scheduled workload, research projects, and usage of surrounding buildings or other activities planned on campus.

D. University's costs for initial planned utility service shutdowns shall be borne by the University. If repeat utility service shutdowns are required due to work necessary to correct **CONTRACTOR**'s defective work, mistakes in new work layout such as misalignment or installation conflicts with other new work, University's costs for repeat shutdown(s) will be deducted from Contract Sum.

1.10 SITE INGRESS AND EGRESS

A. Access to Project site shall be as indicated on the Drawings. Access to Project site is limited to designated routing on existing access roads. The **CONTRACTOR** and their employees, sub **CONTRACTOR**s, suppliers or delivery personal must stay on the designated roads and may not drive, ride or walk to other locations unless prior permission is provided in writing by the University's Representative.

B. **CONTRACTOR** shall take all necessary precaution to ensure the safety of the bicyclists and pedestrians that use the campus roads.

C. **CONTRACTOR shall** clean the site access and roads affected by the Work and shall maintain such in a dust free and safe and usable condition for motorists, bicyclists and pedestrians. During inclement weather **CONTRACTOR shall** closely monitor conditions to prevent slickness of roads.

D. **CONTRACTOR shall** be permitted to block only 1/2 of a street at a time for momentary site access, unless specified otherwise. The street shall be operational and usable by the University at all times.

1.11 MOTOR VEHICLE AND BICYCLE TRAFFIC CONTROL

A. **CONTRACTOR shall** adopt all practical means to minimize interference to traffic. Access to other facilities in the area shall be maintained at all times. The **CONTRACTOR shall** provide a schedule of any activity that will impact traffic, or any planned lane or street closure, for approval by the University's Representative and shall give a minimum of 14 business days notice before closing any street or access.

B. **CONTRACTOR shall** furnish at **CONTRACTOR**'s expense all signage barricades, lights, and flaggers required to control traffic and shall provide and maintain suitable temporary barricades, fences, directional signs, or other structures as required for the protection of the public; and maintain, from the beginning of twilight through the whole of every night on or near the obstructions, sufficient lights and barricades to protect the public and Work.

C. **CONTRACTOR shall** provide directional signs for use throughout the duration of the Project. The quantity shall be determined by the University’s Representative and **CONTRACTOR** during a mandatory Pre-construction site meeting. **CONTRACTOR shall** prepare a mock-up of the sign for approval by the University’s Representative.

D. It is the responsibility of the **CONTRACTOR** performing Work on, or adjacent to, a roadway or highway to install and maintain such devices which are necessary to provide reasonably safe passage for the traveling public, including pedestrians and bicyclists, through the Work, as well as for the safeguard of workers. Before Work begins, a site meeting shall be held to discuss motor vehicle and bicycle traffic control plans for handling traffic through a construction or maintenance zone. Traffic control plans shall be submitted for review by the University's Representative and public agency or authority having jurisdiction over the roadway or highway. These traffic control plans shall be prepared by persons knowledgeable about the fundamental principals of temporary traffic controls and the work activities to be performed. The design, selection, and placement of traffic control devices for the traffic control plan shall be based on engineering judgment and in accordance with Part 6 of the California Manual on Uniform Traffic Control Devices for Streets and Highways.

E. All metal plating and metal bridging shall be non-skid with waffle-patterns or right-angle undulations or shall be coated with a non-skid product. Plating shall be installed with no protruding edges or corners sticking up and with no bouncing or shifting.

PART II - PRODUCTS – Not applicable to this Section.

PART III - EXECUTION – Not applicable to this Section.

END OF SECTION 01 14 00

SECTION 01 25 00

CLARIFICATION/INFORMATION PROCEDURES

PART I - GENERAL

1.01 DESCRIPTION

A. This Section contains the procedures to be followed by **Contractor** for submitting a Request for Information (RFI) upon discovery of any apparent conflicts, omissions, or errors in the Contract Documents or Drawings or upon having any question concerning interpretation.

B. Section Includes

1. RFI Administrative requirements

2. RFI Procedures

3. RFI Execution

1.02 RELATED DOCUMENT SECTIONS

A. Conditions of the Contract: Governing requirements for changes in the Work, in Contract Sum and Contract Time.

B. Section 016100 – PRODUCT REQUIREMENTS: Product options, substitutions, omissions, and improper descriptions.

1.03 ADMINISTRATIVE REQUIREMENTS

A. Description: Section provides procedure for Contractors to obtain interpretation or clarification of the Contract Documents, or identify apparent conflicts, omissions, or errors in the Contract Documents.

B. Responsible Person for **Contractor**: Submit name of the individual authorized to receive Requests for Information documents, and who is responsible for forwarding Request.

C. RFI Format: Submit all Requests for Information on the form attached at the back of this Section, or electronic and/or web-based construction administration software provided or accepted by the University.

1.04 RFI PROCEDURES

A. RFI Format, Numbering and Subject:

1. RFI Format: Submit all requests for clarification or additional information in writing to University's Representative using the RFI Request for Information form provided at the back of this Section or obtained from University's Representative.

2. RFI Numbering: Number RFIs sequentially. Follow RFI number with sequential alphabetical suffix for resubmissions. For example, the first RFI is numbered "001". The second RFI is numbered "002" and so on. The first resubmittal of RFI "002" will be numbered "002a".

3. RFI Subject: Limit each RFI to one (1) subject only.

B. RFI Submittal conditions:

1. Discovery of unforeseen condition or circumstance not described in the Contract Documents.

2. Discovery of an apparent conflict, discrepancy, or inconsistency in or between portions of the Contract Documents.

3. Discovery of a situation, direction or apparent omission that cannot be reasonably inferred from the intent of the Contract Documents.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 EXECUTION OF RFI's

A. Email the University's Representative the RFIs. Emailed RFI requests received after normal business hours and/or received on non-normal workdays, as defined in

Specification Section 013100–COORDINATION, Item 1.07.F.4.A will begin notification time starting at 7:00 a.m. the following workday.

B. Failure to provide proper information: RFIs will not be recognized or accepted if, in the opinion of University's Representative, one of the following conditions exist:

1. **Contractor** submits the RFI as a request for substitution.

2. **Contractor** submits the RFI as a Submittal.

3. **Contractor** submits the RFI as a Contract Document discrepancy or omission without thorough review of the Documents (Capricious submission).

4. **Contractor** submits the RFI assuming portions of the Contract Documents are excluded or by taking an isolated portion of the Contract Document in part rather than in whole.

5. **Contractor** submits the RFI in an untimely manner without proper coordination and scheduling of Work of other Trades.

C. Response Time: Request clarifications or information immediately upon discovery of need. Submit RFI's in a timely manner allowing full response time to avoid impacting Contract Schedule.

1. University's Representative, whose decision will be final, shall resolve issues and respond to questions of **Contractor**, in most cases, within fourteen (14) calendar days. Actual time may be lengthened for complex issues, or shortened for expedited situations, as mutually agreed in writing.

2. After submission of an RFI by **Contractor** and prior to receipt of the RFI response from University, the **Contractor** proceeds with effected Work at own risk. Any portion of the Work not constructed in accordance with University interpretation, clarification, instruction or decision is subject to removal and replacement at **Contractor** expense.

D. Failure to Agree: In the event of failure to agree to the scope of the Contract requirements, **Contractor** shall follow procedures set forth in Article 4 of the General Conditions of the Contract.

3.02 Refer to the following Attachment

A. Request for Information

END OF SECTION 01 25 00

REQUEST FOR INFORMATION

Project #: _____ **Project Title:** _____

RFI #: _____ **Date:** _____ **HCAI #:** _____

UC Davis Health Facilities Design & Construction 4800 2nd Avenue, Suite 3010, Sacramento, CA 95817 **Attn.: Atosa Abedini** P: 916-734-8680 C: 916-284-9426 Email: aabedini@ucdavis.edu	From:	

SUBJECT: _____

SPEC SECTION/DRAWING #: _____ **PARA:** _____ **DETAIL:** _____

RM # _____ **GRID #** _____

TRANSMITTAL RECORD	Requestor to FD&C	FD&C to A/E	A/E to FD&C	FD&C to Requestor	Notes
Date Submitted					

INFORMATION NEEDED: _____

CONTRACTOR'S PROPOSED RESOLUTION: _____

REQUESTOR SIGNATURE: _____ **REPLY REQUIRED BY:** _____

☐ **ATTACHMENTS:** _____

REPLY: _____

REPONDER SIGNATURE: _____ **DATE:** _____

UNLESS OTHERWISE INDICATED ABOVE, THE REPLY TO THIS RFI IS NOT INTENDED TO BE A CHANGE DIRECTIVE. SHOULD THE CONTRACTOR, SUBCONTRACTOR, OR SUPPLIERS FEEL THAT THE REPLY WILL IMPACT THE PROJECT COST OR SCHEDULE; IT SHOULD IMMEDIATELY BE CONVEYED TO THE UNIVERSITY'S FD&C PROJECT MANAGER IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.

COPIES: ☐**University** ☐ **CONSULTANTS** ☐_____ ☐_____ ☐_____ ☐ **FILE**

SECTION 01 25 50

CONTRACT MODIFICATION PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Change Order Administrative Requirements

B. Documentation of Change in Contract Sum and Contract Time

C. Change Procedures

D. Field Orders

E. Stipulated Sum Change Orders

F. Unit Price Change Orders

G. Time and Material Change Orders

H. Cost Proposals and Supporting Documentation

I. Execution of Change Orders

J. Reconciliation of Change Orders

1.02 RELATED DOCUMENT SECTIONS

A. General Conditions of the Contract: Governing requirements for changes in the Work, in Contract Sum and Contract Time.

B. Section 012500 – CLARIFICATION/INFORMATION PROCEDURES

C. Section 012900 – MEASUREMENT AND PAYMENT: Applications for Payment.

D. Section 016100 – PRODUCT REQUIREMENTS: Product options, substitutions, omissions, and improper descriptions.

E. Section 017700 – CLOSEOUT PROCEDURES: Project record documents.

1.03 DEFINITIONS

A. Total Wage Rate: Base rate paid to the worker, including his/her fringe benefits, workman's compensation insurance and subsequent payroll taxes paid by the employer.

1. Use Wage Rate Calculator issued with Division One.

2. Projects in the University Controlled Insurance Program (UCIP) should not include workman's compensation in the wage rates.

B. Consumables: Material purchased in bulk and not expressly accounted for in the listed materials on a change order request. These include but are not limited to, rags, washers, screws, nuts, small bolts, lubricants, cleaning materials, pens, chalk, pencils, tie wire, caution tape, etc. Compensation for consumables shall be incorporated as a 3% percentage increase on direct material costs for trades where these items are routinely used.

C. Non-working Supervision: Non-working supervision is not allowed to be included on a change order per GC article 7.3.3.

1.04 SUBMITTALS

A. Submit the items listed below prior to submitting the 2nd Application for Payment.

1. Total Wage Rates: Provide a wage rates for each key worker of the General Contractor and all Subcontractor tradespeople using the University's digital form for review and in compliance with the general conditions article 7 for approval by the University. Approved rates will be used in the Exhibit 7 Labor Rate Breakdown forms submitted with each Cost Proposal.

1.05 CHANGE ORDER ADMINISTRATIVE REQUIREMENTS

A. Responsible Person for **Contractor**: Submit name of the individual authorized to receive construction change documents, and who is responsible for informing others in **Contractor**'s employ of subcontractors of changes in the work.

B. Exhibit 7 of the Contract includes the following Forms:

1. COST PROPOSAL Form

2. SUPPORTING DOCUMENTATION FOR THE COST PROPOSAL SUMMARY Form

3. CHANGE ORDER Form

4. REPORT OF SUBCONTRACTOR INFORMATION Form

1.06 DOCUMENTATION OF CHANGE IN CONTRACT SUM AND CONTRACT TIME

A. Documentation of Changes in Contract Sum and Contract Time: Provide full information required for evaluation of proposal, of proposed changes and to substantiate costs of changes in the Work.

1. Maintain detailed records of Work completed on time and material basis.

2. Document each quotation for a change in Contract Sum and Contract Time with sufficient data to allow evaluation of the quotation.

B. Additional Data: Upon request, provide additional data to support computations.

1. Quantities of products, labor, and equipment.

2. Taxes, insurance, and bonds.

3. Overhead and profit.

4. Justification for change in Contract Time, if claimed.

5. Credit for deletions from Contract, similarly documented.

1.07 CHANGE PROCEDURES

A. University's Supplemental Instructions: Minor changes in the Work, not involving adjustments to the Contract Sum or Contract time, as authorized by the General Conditions of the Contract, may be presented using Supplemental Instructions or correspondence containing similar information.

B. University Initiated Changes: A Request for Proposal may be issued by University's Representative, which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications.

1. The Request for Proposal may include an estimate of additions or deductions in the Contract Sum or Contract Time for executing the change and may include stipulations regarding overtime work and the period of time the requested response from the **Contractor** shall be considered valid.

2. **Contractor** shall prepare and submit a response to the Request for Proposal within fourteen (14) calendar days.

C. **Contractor** initiated Changes: **Contractor** may propose a change by submitting a request for change to University's Representative, describing proposed change and its full effect on the Work.

1. Include statement describing reason for change, and full description of effects on Contract Sum, Contract Time, related Work and work being performed under separate contracts.

2. Requests for substitutions shall be included under this category, with procedures as specified in Section 016100 – PRODUCT REQUIREMENTS.

1.08 FIELD ORDER

A. Field Order: University's Representative may issue a Field Order, signed by University's Representative, instructing the **Contractor** to proceed immediately with a change in the Work, for subsequent inclusion in a Change Order.

1. The document will describe changes in the Work, and will designate the method of determining what, if any, change is due in the Contract Sum or the Contract Time.

2. Promptly execute the change in the Work indicated in the Field Order prior to acceptance of a Cost Proposal for the Work by the University.

B. Cost and Time Resolution: Costs and time adjustments for changes in the Work shall be per provisions of the General Conditions of the Contract, unless otherwise agreed to prior to issuance.

1.09 CHANGE ORDERS

A. Stipulated Sum Change Orders: **Contractor**'s response to Request for Proposal or Field Order will be considered and a mutually acceptable adjustment in Contract Sum and Contract Time will be determined. Change Order for this stipulated amount will be prepared by University's Representative for execution by University and **Contractor**.

B. Unit Price Change Order: Change Order will be prepared by University's Representative for execution by University and **Contractor**, based on mutually acceptable quantities and pre-determined unit prices.

1. For unit cost or quantities not pre-determined, the Work shall be accomplished under a Stipulated Sum Change Order, if there is no dispute over the estimated or stipulated maximum cost and time for the change.

2. If the amounts are not defined or are disputed, a Field Order will be prepared and issued by University's Representative.

C. Time and Material Change Orders: As directed for changes for where amounts are not defined or are disputed, **Contractor** shall execute the Work, keeping accurate records of time, both labor and calendar days, and cost of materials.

1. **Contractor** shall prepare and submit an itemized account and supporting data after completion of the change, within the time limits indicated in the Conditions of the Contract.

2. University's Representative will determine the change allowable in Contract Sum and Contract Time, as provided elsewhere in the Contract Documents, and make recommendation to University for acceptance of Change Order.

3. **Contractor** shall provide full information as required and requested for evaluation of proposed changes, and to substantiate costs for changes in the Work.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 CONTENT OF COST PROPOSALS

A. Cost Proposals shall include the following:

1. Detailed description of the work involved including:

a. What work is being performed?

b. Where the work is performed?

c. When the work was performed if already completed?

d. When the work is scheduled to be performed if not yet completed?

e. Why this work is a change to the contract?

2. Detailed description of any time impacts associated with the work; refer to General Conditions, paragraph 8.4.

3. Materials

a. Material shall be submitted at the cost paid by the contractor.

1) Invoices may be required to validate that meet the following criteria:

a) Invoices may be from different projects if the following conditions are met:

(1) The COR is before the contractor would reasonably have the material on site to accomplish the COR.

(2) Recent, within last 6 months.

(3) There must be at least enough of the material in question to accomplish the work in the proposed COR.

b) The invoice shall not be modified from the version provided by the vendor.

4. Labor unit breakdown backed up by some sort of industry standard (NECA for electrical, MCAA for plumbing and mechanical, SMACNA for mechanical, Etc.) These standards shall be used at their base rate, with no added percentages nor adjustments. This has been found to be a fair representation of the man-hours required to do these types of work.

a. This project has been determined as NECA normal**.**

5. Wage rate back up matching the submitted back up as described in 1.03.A.

B. Submittal of a Cost Proposal using the Cost of the Work plus Contractor Fee described in General Conditions paragraphs 7.3.5 and 7.3.6 shall include the following items in addition to those listed above:

1. Field Order instructing the change. Only a field order may instruct work to be completed using this basis.

2. Material invoices shall be provided for any item used in Extra Work.

3. Job site work tags identifying daily labor and material usage shall be submitted with:

a. Specific description of the work performed on that tag.

b. Identification of large equipment used

c. Identification of labor class for each individual

d. Location - room number, gridline or distinct location.

e. Signed by the Contractor and University’s Representative.

C. Any coordination required for implementation of a change into the work, documents, or model is and shall be considered part of the allowable markups provided in General Conditions paragraphs 7.3.3.1-18 and 7.3.4.

3.02 EXECUTION OF CHANGE ORDERS

A. Execution of Change Orders: After the University’s Representative has accepted the Change Order Proposal; the University's Representative shall prepare Change Order documents for signature by parties as provided in the Conditions of the Contract.

3.03 RECONCILIATION OF CHANGE ORDERS

A. Schedule of Values: Promptly revise the Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjustment to the Contract Sum.

B. Schedules: Upon completion of the Change Order, promptly revise progress schedules to reflect changes in Contract Time, revising sub-schedules to adjust time for other items of Work as may be affected by the change. Submit revised schedules with next Application for Payment.

END OF SECTION 01 25 50

SECTION 01 29 00

MEASUREMENT AND PAYMENT

PART I - GENERAL

1.01 SECTION INCLUDES

A. Procedures for preparation and presentation of Application for Payment.

B. Procedures for preparation and presentation of Schedule of Values.

1.02 RELATED DOCUMENTS AND SECTIONS

A. GENERAL CONDITIONS of the Contract: Progress Payments and Final Payment.

B. Section 013200 – CONTRACT SCHEDULES

C. Section 017700 – CLOSEOUT PROCEDURES

D. Section 017800 – CLOSEOUT SUBMITTALS

1.03 PAYMENT APPLICATION FORM

A. Payment Application Form: Prepare Applications for Payment using Exhibit 4 provided in the Contract.

1.04 SCHEDULE OF VALUES

A. Coordination. Coordinate preparation of the Schedule of Values with preparation of the Contractor's Contract Schedule and as directed by the University's Representative.

1. Correlate line items in the Schedule of Values with other required administrative schedules and forms, including:

a. Contractor's Contract Schedule.

b. Application for Payment form.

c. List of Subcontractors.

d. List of products (where/if appropriate).

e. List of principal supplier and fabricators.

f. Submittal Schedule

g. Construction Cost Breakdown Sheet.

2. Submit the Schedule of Values to the University's Representative at the earliest feasible date, but in no case later than 7 calendar days before the date scheduled for Submittal of the Initial Application for Payment.

B. Format and Content. Use the Specification Table of Contents as a guide to establish the format for the Schedule of Values.

1. Include the following Project identification on the Schedule of Values:

a. Project name and location.

b. Name of the University's Representative.

c. Project Number.

d. Contractor's name and address.

e. Date of Submittal.

2. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:

a. Generic name.

b. Performance Specification or University Specification section.

c. Name of Subcontractor.

d. Name of manufacturer or fabricator.

e. Name of supplier (if appropriate).

f. Change orders (number) that have affected value.

g. Dollar value. (Percentage of Contract Sum to the nearest one-hundredth percent, adjusted to total 100 percent.)

3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Break principal subcontract amounts down into several line items.

4. Round amounts off to the nearest whole dollar; the total shall equal the Contract Sum.

5. For each part of the Work where an Application for Payment may include materials or equipment, purchased or fabricated and stored, but not yet installed, provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

    a. Differentiate between items stored on-site and items stored off-site. Include requirements for insurance and bonded warehousing, if required.

6. Provide separate line items on the Schedule of Values for initial cost of the materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. **Contractor's** General Conditions overhead and profit shall be a separate line item per month.

8. Allowances (if applicable). Show the line item value of allowances.

1.05 PREPARATION OF APPLICATIONS

A. Preparation of Applications for Payment: The following requirements supplement the provisions of the General Conditions of the Contract. Refer to the GENERAL CONDITIONS OF THE CONTRACT.

1. Present required information in PDF electronic file on the required forms. Media-driven forms are acceptable.

2. Execute certification by verified electronic signature of authorized officer of the **Contractor**.

3. Use data from the approved Schedule of Values. Provide dollar value in each column of application for each line item and portion of Work performed and for products stored, if permitted.

a. List value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for progress Payments. Round off values to nearest dollar. Listed items of work shall be identified by Specification Section number.

b. List products and operations of each major subcontract as separate line item.

c. Include Work Allowances (if any) within line item of Work.

d. Coordinate percentage complete with Progress Schedule.

e. Provide separate line items for each area of work such as but not limited to floors, zones, wings, or other areas that can be clearly identified.

f. The sum of values listed shall equal total Contract Sum.

4. List each authorized Change Order as an extension on the continuation sheet, listing the Change Order number and dollar value as for an original item of Work. Change Order shall be broken down same as Application for Payment.

5. No Change Order shall be included with Application for Payment until approved in writing by University and University's Representative.

6. Refer to 1.05 for other items required for the Application for Payment.

B. Final Payment: Prepare Application for Final Payment as specified in Section 017700 – CLOSEOUT PROCEDURES.

1.06 SUBMISSION OF APPLICATIONS FOR PAYMENT

A. Submission of Applications for Payment: The following requirements supplement provisions of the General Conditions of the Contract. Refer to the GENERAL CONDITIONS OF THE CONTRACT.

1. Submit one (1) PDF electronic file of each Application for Payment with verified electronic signature, such as DocuSign. Round values to nearest dollar or as specified for the Schedule of Values.

2. Submit an updated Construction Progress Schedule with each Application for Payment and specified in Section 013200 – CONTRACT SCHEDULES.

3. Submit one (1) PDF electronic file of Schedule of Values in accordance with the General Conditions of the Contract. Form and content shall be acceptable to the University. Transmit under PDF electronic transmittal letter. Identify University's Project Name and University's Project Number.

a. List installed value of each major item of Work and for each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar. Listed items of Work shall be identified by Specification section number. Each value will be based on a percent complete of that line item.

b. For each major subcontract, list products and operations of that subcontract as separate line items.

c. Coordinate listings with Progress schedule. **Contractor** project General Conditions plus overhead and profit shall be a separate line item in the Application for Payment; and be divided in an equal amount for each month part of the Contract Time period.

1) At 50 percent completion of the work, or at other times the University’s Representative deems appropriate, the University’s Representative may request the monthly amount of overhead and profit be adjusted, if the contract schedule indicates going beyond the Contract End Date.

d. For items on which payments will be requested for on-site stored products, list sub-values for cost of on-site stored products with taxes paid. If stored products are not on-site, they must be stored in a bonded warehouse or location approved by the University's Representative prior to including on the Application for Payment.

e. Submit a sub-schedule for each separate Phase of Work specified in Section 011100. Include scheduling of sequences within each phase indicated on the drawings.

f. The Sum of values listed shall equal total Contract Sum.

g. When University's Representative requires substantiating information, submit data justifying line-item amounts in question.

h. Provide one (1) PDF electronic file of data with cover letter for each copy of Application. Show Application number and date, and line item by number and description.

4. Submit Applications for Payment, Continuation Sheets and Schedule of Values under PDF electronic transmittal letter. **Contractor** shall identify all payment application documents by University's Project Name and University's Project Number.

1.07 SUBSTANTIATING DATA

A. University's Representative may request substantiating information. Submit data reconciling line-item amounts in question.

B. Provide one (1) PDF electronic file of data with cover letter for each copy of submittal. Show Application number including date and line item by number with description.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 29 00

SECTION 01 31 00

COORDINATION

PART I - GENERAL

1.01 SECTION INCLUDES

A. Project Meetings

B. Submittals Requirements

C. General **Contractor** Coordination

D. Coordination of Subcontractor and Separate Contracts

E. University Criteria

1.02 RELATED REQUIREMENTS

A. Section 011100 – SUMMARY OF THE WORK: Description of Contract Documents.

B. Section 013200 – CONTRACT SCHEDULES

C. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

D. Section 013500 – SPECIAL PROCEDURES: Interim Life Safety Measures (ILSM).

E. Section 014500 – QUALITY CONTROL

F. Section 014550 – INSPECTION AND TESTING OF WORK

G. Section 015200 – CONSTRUCTION FACILITIES

H. Section 015500 – VEHICULAR ACCESS AND PARKING: Traffic Regulation.

I. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS

J. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

K. Section 016100 – PRODUCT REQUIREMENTS

L. Section 017300 – CUTTING AND PATCHING

M. Section 017700 – CLOSEOUT PROCEDURES: Coordination of completion reviews, inspections, and submission of documents.

N. Section 017800 – CLOSEOUT SUBMITTALS: As-Built Documents.

1.03 MEETINGS

A. Pre-Construction/Site Mobilization Conference: University's Representative will administer site mobilization conference at Project site for clarification of responsibilities of University, University's Representation and **Contractor**, use of site and for review of administrative procedures. Site mobilization conference shall be held within fourteen (14) calendar days of Notice to Proceed, unless otherwise directed by University's Representative.

1. Agenda: Pre-Construction/Site Mobilization Conference shall cover the following topics at a minimum:

a. Special Project Procedures: Implementation of requirements as specified in Section 013100 – COORDINATION.

b. Subcontractors List: Provide PDF electronic file. Distribute and discuss list of subcontractors and suppliers.

c. Construction Schedule: Provide per Section 013200. Distribute and discuss initial construction schedule and critical work sequencing of major elements of Work, including coordination of University furnished/**Contractor** installed (UFCI) products, University furnished/ University installed (UFUI) products, and work under separate contracts, by utility agencies and companies and University.

d. Designation of Key personnel: Designate key personnel and update project directory for University, University's Consultants, **Contractor**, major subcontractors, major materials suppliers, serving utility agencies and companies, other contractors performing work under separate contracts and governing authorities having jurisdiction.

e. Project Communication Procedures: Review requirements and administrative requirements for written, electronic and oral communications.

f. Change Procedures: Review requirements and administrative procedures for Change Orders, Field Orders, University's Representative's Supplemental Instructions, and **Contractor**'s Requests for Information.

g. Coordination: Review requirements for **Contractor**'s coordination of Work; review sequence and schedule for work being performed for University under separate contracts.

h. Submittals Administration: Provide per Section 013300 and Section 016100. Review administrative procedures for shop drawings, project data and sample submittals and review of preliminary submittals schedule.

i. Project As-Built Documents: Provide per Section 017700 and Section 017800. Review requirements and procedures for project as-builts, specifications and other documents.

j. Construction Facilities and Temporary Utilities: Provide per Section 015100 and Section 015200. Designate storage and staging areas,

construction office areas; review temporary utility provisions; review University requirements for use of premises.

k. Materials and Equipment: Review substitution requirements; review schedule for major equipment purchases and deliveries; review materials and equipment to be provided by University (UFCI and UFUI products).

l. Site Access by University's Representative and University's Consultants: Review requirements and administrative procedures **Contractor** may institute for identification and reporting purposes.

m. Testing and Inspection: Provide per Section 014550 and other sections of the Contract. Review tests and inspections by independent testing and inspection agencies, manufacturers, and governing authorities having jurisdiction.

n. Permits and Fees: Review Contract requirements; review schedule and process for obtaining permits and paying fees.

o. Hours of Work and Work Restrictions per Section 011400.

p. Hot Works Permit.

B. Billing Meetings: A billing meeting will be conducted by the University's Representative each month prior to submittal of the Application for Payment. Agenda: review of the percent complete relating to the submitted Schedule of Values. Prior to the Billing Meeting the **Contractor** will submit a draft of the Application for Payment for review by the IOR and University Representative.

C. Progress Meetings: Progress meetings shall be periodically scheduled throughout progress of the Work. Frequency shall be as determined necessary for progress of Work. Generally, it is intended progress meetings be held once a week as designated by the University's Representative.

1. Administration: University's Representative shall make physical arrangements for meetings and prepare agenda with copies for participants, preside at meetings, record minutes and distribute an electronic file within four (4) workdays to **Contractor** University’s Consultants, and other participants affected by decisions made at meetings.

2. Attendance: **Contractor**'s Project Manager and jobsite Superintendent shall attend each meeting. **Contractor**'s subcontractors and suppliers may attend as appropriate to subject under discussion. University will have a representative at each meeting. University's Consultants, as appropriate to agenda topics for each meeting and as provided in University/Consultant Agreement, will also attend.

   a. Suggested Agenda for Progress Meetings:

      1) Building Code/Fire Marshal Issues

      2) Design Issues

      3) Submittals and Long Lead Items

      4) UFCI and UFUI products.

      5) Request for Information

      6) Safety Issues

      7) Scheduling Status/1 Week Prior and 3~~2~~ Week Look Ahead

      8) Potential Schedule Delay Issues

      9) Incomplete or Non-Conforming Work

      10) Inspection Requests

      11) Utility Shutdowns and Dig Notifications

      12) Instructional Bulletins and Field Orders

      13) Change Orders/Cost Proposals

      14) Payment Applications and As-Built Documents

      15) Miscellaneous Business

      16) Other items affecting progress of the Work

D. Guarantees, Bonds, Service and Maintenance Contracts Review Meeting: Eleven months following the date of Substantial Completion, a meeting will be conducted by University's

Representative to review the guarantees, bonds and service and maintenance contracts for materials and equipment.

E. In addition to meetings listed above, **Contractor** shall hold coordination meetings and pre-installation conferences to assure proper coordination of Work.

1. Pre-installation Conferences: When required in individual Specification Sections, convene a pre-installation conference prior to commencing Work.

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

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

F. Location of all meetings will be as designated by University's Representative. Participants at all meetings shall be University's Representatives, Consultants and/or Vendors, **Contractor**, Superintendent, Subcontractors and others as appropriate.

1.04 SUBMITTALS

A. Coordination of Submittals: Schedule and coordinate submittals as specified in Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES, Section 017700 – CLOSEOUT PROCEDURES and Section 017800 – CLOSEOUT SUBMITTALS.

1. Coordinate submittal effort of various trades, subcontractors and suppliers having interdependent responsibilities for installing, connecting, and placing into service such equipment, materials or installations as necessary for the Work.

2. Coordinate requests for substitutions to assure compatibility of space, operating elements, and effect on work of others.

B. Coordination/Engineering Drawings: Submit in accordance with Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES and as specified herein.

C. Work Plans: Submit as specified herein.

1.05 COORDINATION

A. Coordination: **Contractor** shall coordinate the Work as stated in the General Conditions of the Contract. Work of the Contract includes coordination of the entire work of the Project, from beginning of construction activity through Project closeout and warranty periods. **Contractor** shall also coordinate Work under the Contract with work under separate contracts by University. **Contractor** shall cooperate with University and others as directed by University's Representative in scheduling and sequencing the incorporation into the

Work of University Furnished/**Contractor** Installed (UFCI) products identified in the Contract Documents.

1. Coordinate completion and cleanup of work of the separate trades, subcontractors, vendors, etc., in preparation for University occupancy

2. After University occupancy, coordinate access to site by various trades, subcontractors, vendors, etc., for correction of defective work and/or work not in accordance with Contract Documents, to minimize University disruption.

3. Assemble and coordinate closeout submittals specified in Section 017700 – CLOSEOUT PROCEDURES.

B. Construction Interfacing and Coordination: Layout, scheduling and sequencing of Work shall be solely **Contractor**'s responsibility. **Contractor** shall bring together the various parts, components, systems and assemblies as required for the correct interfacing and integration of all elements of Work. **Contractor** shall coordinate Work to correctly and accurately connect abutting, adjoining, overlapping and related elements, including work under separate contracts by University and utility agencies, if any.

C. Installation of Systems into Project Space: Follow routings shown for pipes, ducts and conduits as closely as practicable, as shown on the Contract Documents with due allowance for available physical space; make runs parallel with line of building. Utilize space efficiently to maximize accessibility for other installations, future maintenance and repairs. In finished areas, except as otherwise shown, conceal pipes, ducts and wiring in the construction. Coordinate locations of fixtures and outlets with finish elements.

D. Utility Work: Work occurring on or in the immediate vicinity of critical utilities must be directly supervised at all times by **Contractor**'s qualified personnel. Requirements stated herein for notification, work plans, dig notification forms and marking locations of existing utilities shall apply. **Contractor** will be held fully liable for costs and damages due to unplanned interruption of critical utilities, including any personal injury to Hospital patients, visitors, or staff.

1. Provide supervision and coordination necessary to meet requirements of electrical power connection as set forth by the Sacramento Municipal Utility District (SMUD).

2. Provide reasonable and convenient staging and access areas to permit SMUD, its vendors or subcontractors, to install, modify or remove electrical transformers or other components of the electrical power system furnished and installed by SMUD.

1.06 COORDINATION OF SUBCONTRACTORS AND SEPARATE CONTRACTS

A. Conflicts: Conflicts shall be resolved by the **Contractor**. **Contractor** bears primary responsibility for conflict resolution regarding the coordination of all building trades, subcontractors and suppliers.

B. Superintendence of Work: **Contractor** shall appoint a field superintendent who shall direct, supervise, and coordinate all Work in the Contract Documents.

C. Subcontractors, Trades and Materials Suppliers: **Contractor** shall require all subcontractors, trades, crafts and suppliers to coordinate their portions of Work with the

Superintendent to prevent scheduling, sequencing, dimensional and other conflicts and omissions.

D. Coordination with Work Under Separate Contracts: **Contractor** shall coordinate and schedule Work under Contract with work being performed for Project under separate contracts by University. **Contractor** shall make direct contacts with parties responsible for work of the Project under separate contracts, in order to provide timely notifications and to facilitate information exchanges.

E. Service Connections: Except as otherwise indicated, final connection of mechanical services to general work is defined as being mechanical work; final connection of electrical services to general work is defined as electrical work.

1.07 UNIVERSITY CRITERIA

A. During the Base Construction time, **Contractor** shall allow University 14 calendar days to move University equipment. **Contractor** shall notify University's Representative in writing a minimum of fourteen (14) calendar days prior to completion of area described above.

1. **Contractor** shall show this time as a distinct activity on the detailed project schedule.

B. Equipment Coordination: **Contractor** and University supplied equipment will require complete installation data be exchanged directly between **Contractor** and vendors and subcontractors involved as progress of Project requires. Individual requesting information shall advise when it is required. Incorrect, incomplete, delayed or improperly identified equipment causing delay or error in installation will require entity causing such action to be liable for modifications or replacements necessary to provide correct and proper installation, including relocations.

C. **Contractor** shall provide large scale casework and equipment drawings for casework and equipment service rough-in locations (dimensioned from building features), service characteristics, and locations of studs or blocking where such locations are critical to mounting or otherwise installing equipment and casework. Furnish sizes and spacing required for mechanical and electrical cutouts, and a complete brochure of fittings, sinks, outlets, or other information to provide a complete assemblage of the items and accessories being furnished.

D. Interruption of Services: Construction Work shall accommodate University's use of surrounding and adjacent premises during the construction period and shall provide continuous public access and use of surrounding and adjacent facilities. **Contractor** shall not deny access to public use facilities until an alternate means of public use has been provided. An interruption of service is defined as any event which in any way interrupts, disrupts or otherwise discontinues, even momentarily, the services provided by University to its patients and staff. Adequate notice, as described below, shall be given to University when any interruption of services or interference with the use of existing buildings and roads are anticipated. Any interruption of service will be made only by University upon such notice. Interruptions to University services will not be made without prior notification and approval by University. **Contractor** shall never interrupt any University service without direct University participation.

1. Dig Notification: **Contractor** shall complete and submit for review to University's Representative, a Dig Notification Form, included at the end of this section, and obtain written authorization from University prior to the commencement of any digging activities. Digging activities include exploratory demolition, soils

excavation, concrete core drilling, and saw cutting. **Contractor** shall include all pertinent information with the Dig Notification Form and submit with detailed work plan fourteen (14) calendar days prior to desired digging activity.

2. The **Contractor** shall contact USA North 811 prior to starting underground Work to locate existing underground utilities.

3. **Contractor** shall mark locations of all known utilities on ground of dig area with marker paint.

4. Prior to commencement of digging activities, **Contractor** shall verify project inspector has inspected the dig site and confirmed the site marking as accurate, complete and in conformance with site utility plans.

5. **Contractor** shall verify with University's Representative that all interested hospital departments have been notified of intent to begin digging operation.

6. Record documents are required for dig activities. **Contractor** shall provide As-Built drawings.

E. Shutdown Procedures: **Contractor** shall complete and submit for review and approval to University a Request for Shutdown form, included at the end of this section. **Contractor** shall include all pertinent information to assist University in coordination of shutdown activities. The Shutdown Request Form shall be submitted with a detailed work plan addressing the proposed shutdown not less than fourteen (14) calendar days prior to desired shutdown.

F. The University does not normally charge for its shutdown support services. However, if poor planning and/or poor execution of a shutdown by the **Contractor** causes excessive time and effort for University personnel, the University reserves the right to back charge the **Contractor** for this effort required to support such shutdown.

1. **Contractor** shall verify with University's Fire Marshal that all appropriate Interim Life Safety Measures (ILSM) are in place.

2. **Contractor** shall determine that proper and appropriate coordination and notification has been completed, including written authorization from University's Representative, prior to shut down.

3. Service shutdowns shall require specific work plans to be submitted to and coordinated with University's Representative. Work Plan should reflect various work trades, activities or entities requiring active participation with University teams to coordinating hospital functions with construction activities.

   a. **Contractor** shall request, schedule, and conduct a General Work Plan Meeting prior to any work activity occurrence. During this meeting **Contractor** and University shall produce and agree to a list of work activities, which will require digging and/or shutdown coordination and procedures.

   b. University's Representative, upon receiving the agreed submission for coordination, shall schedule the actual digging and/or shutdown at the earliest possible date not later than fourteen (14) calendar days from

receipt of the submission. Operation of valves, switches, etc. to affect shutdowns shall be operated by University personnel only.

c. A shutdown is defined as any interruption of services provided by University to its patients and staff.

4. Planned service shutdowns shall be accomplished during periods of minimum usage. **Contractor** shall plan work to restore service in minimum possible time and shall cooperate with the University to reduce number of shutdowns.

a. Notwithstanding the provisions of Article 14.6 of the General Conditions of the Contract, **Contractor** may be required to perform certain types of work outside normal time periods.

1) Non-normal times shall include, but not be limited to, periods of time before 7:00 a.m. and after 5:00 p.m. in the evening, weekend days, or legal holidays, or such periods of time which constitute split shifts or split working periods.

2) **Contractor** shall include allocation of the cost of this work as part of the base bid and shall not be entitled to additional compensation as a result of such work during non-normal time periods.

3) **Contractor** shall include the non-normal periods as distinct activities on the detailed project schedule.

4) **Contractor** is advised and **Contractor** shall be prepared, at University written request, to perform certain shutdown and asbestos related work during non-normal time periods.

G. Utility locations: Refer to Section 017600. General location of utility lines and services may be shown on the drawings or described elsewhere, University does not warrant the accuracy of the locations shown or described. Determination of the actual on-site locations of utility lines and services prior to the commencement of work shall be the responsibility of the **Contractor**. **Contractor** shall complete layout/research for Points of Connection (P.O.C.) and clean/prep piping at P.O.C. All capping, relocation or removal of such lines and services shall be performed by **Contractor** as a part of the Contract. New/continued piping and services installation shall be prefabricated and in place prior to the shutdown. All materials and tools required to complete the work must be at the shutdown location(s). **Contractor** shall not assume existing valves will hold 100%. **Contractor** is required to have at least one (1) alternate method (including parts and equipment) to complete installation once shutdown has started. Note: only wheel type cutters shall be used on copper pipe to reduce contamination to existing systems/valves.

H. Detailed Work Plans: **Contractor** shall develop and submit for review and approval to University's Representative detailed work plans for specific work activities, both inside and outside the work area, associated with impact to, or interruption of services and operation, and dig activities. Work Plans shall be submitted as a PDF electronic file with Table of Contents indexed. Work Plans shall include written description of work activity, detailed schedule with proposed sequence of operation and activity duration, type of equipment to be used, a copy of site plan highlighted to indicate sequencing and location of work and equipment, completed Request for Shutdown and/or Dig Notification forms as applicable, conformance to ILSM, and control methods for noise, vibration and airborne contaminants.

1. Work Plan submittal will not be accepted unless all required information is provided at time of submittal.

2. Submit Work Plan at least fourteen (14) calendar days prior to the commencement of any associated work activities.

3. Coordination/Engineering Drawings: **Contractor** shall provide a complete set of Coordination/ Engineering Drawings that indicates the architectural and structural building components; and combines all piping, conduits, fire sprinkler system, equipment, hangers, braces and other building components into one composite drawing for each floor, wing or area of work. Submit the Coordination/ Engineering Drawings as a bookmarked PDF electronic file. These drawings are for the **Contractor**'s and University's use during construction and shall not be construed as replacing any shop drawings, "As-Builts", or record drawings required elsewhere in the Contract Documents. University's review of these drawings is for design intent only and shall not relieve the **Contractor** of the responsibility for coordination of all work performed per the requirements of the Contract.

   a. **Contractor** shall prepare and submit complete ¼" = 1' - 0" coordination drawings, including plans, sections, details as are appropriate indicating the area layout, complete with debris removal area and materials access points, and all mechanical and electrical equipment in all areas and within above and below ceiling spaces for new and existing conditions, including bottom of all ducts, plenum, pipe and conduit elevations. Drawings shall show all structural and architectural components, restraints and other obstructions that may affect the work. Electronic or photo reproduction of University's Architectural Drawings is not acceptable.

   b. **Contractor** and each Subcontractor shall ensure all relevant mechanical and electrical equipment, piping, conduit, fire sprinkler system, ceiling

hangers, braces etc., are shown and will fit, together with necessary items such as lights, ducts, fans, pumps, piping, conduit and the like.

c. **Contractor** shall indicate all locations of expansion/ seismic joints and indicate how expansion for piping, conduit and other components is provided.

d. **Contractor** shall indicate all locations for access doors or other means of access at conditions above and below for items requiring access or service including but not limited to valves, mechanical equipment, electrical equipment valves and other components. The **Contractor** is responsible that piping, conduit, braces and other obstructions do not block access to items indicated above.

e. Submit completed and fully coordinated PDF electronic indexed file drawings with bookmarked Sheet Index together with **Contractor**'s comments indicating possible areas of conflict for review to University's Representative prior to start of work.

f. Penetrations: **Contractor** shall prepare a sleeving layout (¼" scale) indicating size and locations of sleeves. Trades shall indicate to **Contractor** their requirements and locations. PDF electronic files to applicable trades and University's Representative.

g. Completion of work: All coordination drawings shall be submitted together with record (as built) drawings of all trades involved in accordance with Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 Refer to the following attachments

A. Request for Shutdown (RFS) Info/Impact Report

B. Dig Notification Form

END OF SECTION 01 31 00

REQUEST FOR SHUTDOWN (RFS) INFO/IMPACT REPORT

PROJECT NAME: _____

UNIVERSITY RFS# _____

PROJECT #: _____ **HCAI #:** _____ **CONTRACTOR RFS #:** _____

TODAY'S DATE: _____ **SHUTDOWN DATE:** _____ **SUSPEND DATE:** _____

TO: UC DAVIS HEALTH **Facilities Design & Construction** **4800 2nd Avenue, Suite 3010** **Sacramento, CA 95817** **P: 916-734-7024** **Project Manager's email address:** **aabedini@ucdavis.edu**	**FROM:**

Request Date: _____ **Shutdown Target Date:** _____

Requested By: _____ **Requestor's Phone #:** _____

Shutdown Work (**Utility Specific**): _____

Scope (**Brief Description of Work**): _____

Impact (**Areas & Users**): _____

Additional Comments: _____

DIG NOTIFICATION FORM

PROJECT #: _____ **HCAI#:** _____ **DATE:** _____

TO: UC DAVIS HEALTH **Facilities Design & Construction** **4800 2nd Avenue, Suite 3010** **Sacramento, CA 95817** **P: 916-734-7024** **Project Manager's email address:** aabedini@ucdavis.edu	**FROM:**

1. Has USA been notified? YES___ NO___
   When? _____
2. Are all known utilities marked? YES___ NO___
3. Location of dig shown on attached site plan? YES___ NO___
   Purpose _____
4. **Dates digging will take place** _____
   Place _____

Signed: _____

UNIVERSITY USE ONLY

Date received: _____

1. Utilities verified by IOR? YES___ NO___
2. Dig activities coordinated with all parties? YES___ NO___
3. Comments: _____

Date Authorized: _____ Signed: _____

Date Returned: _____ Signed: _____

Comments: (Utilities encountered, disruptions, successes, weather, etc.)

Copies: **University** _____ **Consultants** _____ **File**_____

SECTION 01 32 00

CONTRACT SCHEDULES

PART I - GENERAL

1.01 SCOPE

A. Preliminary Contract Schedule, Contract Schedule, updated Contract Schedules, Short Interval Schedules (SIS), Recovery Schedules and As Built Schedule.

B. Sub-networks of activities (Fragnets) supporting Time Extension Requests.

1.02 DEFINITIONS

A. Construction Schedule/CPM Schedule/Schedule: The most recent; Baseline Schedule, Updated Schedule or Revised Schedule.

B. Final Baseline Schedule: A final and ongoing Schedule for the project that has been reviewed and accredited by the University's Representative

C. Critical Work activities are defined as Work activities that, if delayed or extended, will cause a critical delay as defined in General Conditions Article 8. All other Work activities are defined as non-critical Work activities and are considered to have float.

D. Float is defined as the time that a non-critical Work activity can be delayed or extended without causing a critical delay as defined in General Conditions Article 8. Neither the **Contractor** nor the University shall have an exclusive right to the use of float. Float is a shared resource available to each party to the contract. The **Contractor** shall document the effect of the use of float on the updated Contract Schedule.

E. Recovery Schedule: Schedule required when any Revised Schedule or Update Schedule shows the work to be more than 14 calendar days behind the latest University-accepted contract end date

F. Short Interval Schedule (SIS): Schedule prepared on a weekly basis demonstrating the work accomplished the prior week and work planned for the upcoming three weeks.

1.03 SUBMITTALS

A. Submit the following in accordance with Section 01 33 00 Shop Drawings, Product Data, Samples:

1. Proposed Scheduling Software and qualifications of individual preparing schedules.

2. Preliminary Contract Schedule

3. Contract Schedule including graphical and tabular reports.

4. Monthly Updates to Contract Schedule, including Narrative Report.

5. Short Interval Schedules

6. Final As-Built Schedule

B. Include an electronic version of all submittals required by this specification, including Narrative prepared in MS Word or .pdf format, CPM schedule in .xer file (P6 backup) or other schedule native file format if accepted under 1.3. A.1 above, .pdf of full schedule, and .pdf of critical path. The following fields shall be included:

1. Activity identification

2. Activity description

3. Duration, start, and finish dates.

4. Percentage of completion

5. Total float

6. Responsible party

7. Predecessors and successors

PART II - PRODUCTS

2.01 SOFTWARE

A. The **Contractor** shall use Primavera P6 by Oracle Corporation, or equal to produce the schedule and all required graphical and tabular reports.

PART III - EXECUTION

3.01 PRELIMINARY CONTRACT SCHEDULE

A. Within 10 calendar days after the Notice of Selection as the Apparent Lowest Responsible Bidder, **Contractor** shall submit the Preliminary Contract Schedule in both native and .pdf format to the University's Representative for acceptance. The Preliminary Contract Schedule shall represent the **Contractor**'s plan for accomplishing the work within the Contract time showing all significant milestones for the Contract period as well as a detailed work plan for the first 90 calendar days following the Notice to Proceed. This detailed work plan shall identify in detail the following activities for the first 90 calendar days:

1. Preparation of equipment and material submittals for review. List Project submittals within Schedule per each specification section including Division 1 requirements. Indicate dates for submission of required submittals. Note: schedule shall include 18 calendar days for the University's review of the Preliminary Contract Schedule.

2. Make submissions within the following number of days after the Notice to Proceed:

    a. Items needed in initial stages of Work or requiring long lead-time for ordering: 30 calendar days.

    b. Deferred approval submittals, for review and approval by agencies such as University's when required: 60 calendar days.

    c. Electrical, mechanical and equipment items other than those covered by item "a" above: 60 calendar days.

    d. All other items: 90 calendar days.

3. Procurement schedule.

4. Critical Path for the first 90 calendar days.

B. The Preliminary Contract Schedule shall acknowledge significant known constraints and include all anticipated activities prior to the Notice to Proceed.

C. The Preliminary Contract Schedule shall not include any actual dates or progress measured against any activities.

D. Acceptance of the Preliminary Contract Schedule is a condition for approval of the first progress payment application.

E. The **Contractor**'s progress shall be measured against the Preliminary Contract Schedule until such time as the University accepts the **Contractor**'s first Contract Schedule. The Preliminary Contract Schedule shall be incorporated into the **Contractor**'s proposed Contract Schedule.

F. Unless approved by the University's Representative, there shall be no activities shown with durations greater than 14 calendar days (excluding submittals, submittal reviews, and procurement activities).

3.02 CONTRACT SCHEDULE (BASELINE)

A. The Contract Schedule shall represent a practical plan to fully complete the Contract within the Contract Time. The Contract Schedule shall include a complete sequence of construction, in adequate detail for coordination of the Work and shall be coordinated with the preparation of the Schedule of Values per 01 29 00 Measurement and Payment.

B. Form

1. The proposed first contract schedule shall be produced using CPM (Critical Path Method) techniques, in the PDM (Precedence Diagram Method) method of scheduling. The Contract Schedule shall be calculated using the Retained Logic method. Progress override calculations shall not be acceptable. The schedule shall not use negative float or constraints on work activities.

2. The Contract Schedule shall identify all holidays and non-working days.

3. Identity of the party responsible for the activity (i.e., University, General **Contractor**, specific subcontractor, etc.)

4. The Contract Schedule activities shall be coded with the following information applicable to each activity:

a. Area of the project

b. Identity of the party responsible for the activity (i.e., University, General **Contractor**, specific subcontractor…)

c. Specification section applicable to activity

d. Phase

e. Sequence – The following sequences shall be identified:

1) Administrative

2) Submittal and Review

3) Fabrication

4) Construction: including phasing and sequencing as identified in 011400 Work Restrictions

5) Inspection, Commissioning, and Close-out

C. Content

1. The Contract Schedule shall identify all Work activities in correct sequence for the completion of the Work within the Contract Time. Work activities shall include the following:

   a. Major **Contractor**-furnished equipment, materials, and building elements, and scheduled activities requiring submittals or University's Representative's prior acceptance.

      1) Show dates for the submission, review, and approval of each such submittal. Dates shall be shown for the procurement, fabrication, delivery, and installation of major equipment, materials, and building elements, and for scheduled activities designated by the University.

      2) The schedule shall allow submittal review time in accordance with Section 01 33 00 Shop Drawings, Product Data, Samples.

   b. System test dates.

   c. Scheduled overtime Work to the extent permitted by Contract Documents.

   d. Dates **Contractor** requests designated workspaces, storage area, access, and other facilities to be provided by the University.

   e. Dates **Contractor** requests orders and decisions from the University on designated items.

   f. Dates **Contractor** requests University-furnished equipment.

   g. Dates **Contractor** requests University-furnished utilities.

   h. Planned dates for shutdown, connection and relocation of existing utilities.

   i. Planned dates for connecting to or penetrating existing structures.

   j. Planned dates for scheduled inspections as required by Codes, or as otherwise specified.

   k. Commissioning Sequence and activities for all Building Systems.

2. Unless approved by the University's Representative, there shall be no activities shown with durations in excess of 7 calendar days (excluding submittals, submittal reviews, and procurement activities). Milestones should be listed for the completion of wings, floors, and other similar areas.

3. The allowable monthly rain days per the Supplemental Conditions shall be incorporated into the Schedule.

4. Identify types of calendars used and the logic of their application.

D. Submission

1. The first Contract Schedule shall be submitted to the University not later than 30 calendar days after Notice to Proceed. The period covered by Contract Schedule shall be the Contract Time as specified in the Notice to Proceed. The Contract Schedule shall incorporate the logic of the Preliminary Contract Schedule covering the first 90 calendar days following the Notice to Proceed. Items to be included with first submission:

    a. Contract Schedule (Baseline)

    b. Critical Path Schedule excluding all non-critical Work activities.

    c. Narrative

2. Tabular Computer Reports

    a. As requested by the University, the **Contractor** shall submit various computer-generated tabular reports.

    b. As requested by the University's Representative, the **Contractor** will be required to submit additional Schedule Reports.

E. Acceptance

1. Upon receipt, the University's Representative shall review the proposed first Contract Schedule. Within 21 calendar Days of the University’s receipt of the proposed first Contract Schedule, the University's Representative shall schedule a review meeting with the **Contractor** for the purpose of jointly reviewing the proposed first Contract Schedule.

2. If the proposed first Contract Schedule is accepted by the University's Representative, it shall become the Contract Schedule (or Baseline Schedule). Such acceptance shall not relieve **Contractor** from its responsibility to fully complete the Contract within the Contract Time, nor shall it relieve **Contractor** from sole responsibility for any errors in the Contract Schedule.

3. If the **Contractor** or the University's Representative determines the proposed first Contract Schedule to need revision, the **Contractor** shall revise and resubmit the proposed first contract schedule to the University's Representative within 14 calendar days for acceptance. If accepted, it shall become the Contract Schedule. Such acceptance shall not relieve **Contractor** from its responsibility to fully complete the Contract within the Contract Time, nor shall it relieve **Contractor** from sole responsibility for any errors in the Contract Schedule If not accepted the **Contractor** will resubmit within 10 calendar days for a new review period to start.

a. No progress payment beyond the second progress payment will be paid to the **Contractor** until such time as the University's Representative has approved the **Contractor**'s first proposed Contract Schedule.

F. Schedule Logic

1. Activity schedule logic should normally be of Finish-to-Start relationship type and assembled to show order in which **Contractor** proposes to carry out the Work. The logic should indicate restrictions of access, availability of Work areas, and availability and use of manpower, materials, and equipment. Form basis for assembly of schedule logic on the following criteria:

a. Indicate which activities must be completed before subsequent activities can be started.

b. Indicate which activities can be performed concurrently.

c. Indicate which activities must be started immediately following completed activities.

d. Indicate resource sequencing due to availability or space restrictions.

e. Lags shall not be used if can be represented with additional schedule detail. Finish-to-start logic ties with positive lags are not permitted. All positive time consumption should be represented by a schedule activity. Start-to-start, or finish-to-finish logic ties with negative lags are not permitted.

f. Lags in Start-to-Start or Finish-to-Finish relationships must not exceed the duration of the predecessor or successor activity, respectively.

G. Non-Sequestering of Float

1. **Contractor** shall not sequester float through scheduling techniques, including, but not limited to, constrained dates, extending Work Activity duration estimates, using preferential logic, such as lag or negative lag (lead), unless specifically requested in writing and approved by University's Representative. It is acknowledged that University-caused or **Contractor**-caused time savings to Activities on, or near, the critical path will increase float, such increase in float shall not be for the exclusive use or benefit of either University or **Contractor**.

H. Out of Sequence Logic:

1. Resolution of conflict between actual work progress and schedule logic: When out of sequence activities develop in Schedule because of actual construction progress, **Contractor** shall submit revision to schedule logic to conform to current status and direction and include reasons in schedule update Narrative.

I. Preferential Logic:

1. The intended purpose of scheduling on a construction project is to help ensure that **Contractor**'s work on the project is adequately planned, tracked and managed. A construction schedule can be as simple as a list of activities, organized in a logical sequence, and time scaled. The concept of construction scheduling is to see that all activities necessary to complete the work, in accordance with the contract documents requirements, are properly planned, coordinated and managed. When **Contractor**'s schedule activities are not sequenced in the most logical manner, but rather, in a manner as to create the maximum possible opportunity for University interference to claim delay or interruption, the University will reject the schedule with a request of different sequence of activities.

3.03 EXPERIENCE REQUIREMENTS

A. **Contractor** shall designate an individual from **Contractor**'s staff or a consultant who shall be responsible throughout the duration of the project for preparation of all schedules and reports as required by this specification. This individual shall also be required to attend all meetings with the University's Representative as required by this specification. The **Contractor** shall demonstrate to the satisfaction of the University that the individual or consultant has at least 3 years of experience preparing, maintaining, and administering detailed project schedules on projects of the same or similar size and complexity as this project. The **Contractor** shall also demonstrate to the satisfaction of the University that the individual or consultant is proficient in the use of the scheduling software proposed for use by the **Contractor** on this project.

B. Within 14 calendar days after the Notice of Selection as the Apparent Lowest Responsible Bidder, **Contractor** shall provide the University with the identification, qualifications, and experience of and references for the proposed individual or consultant.

3.04 MONTHLY UPDATES

A. After acceptance of the first proposed Contract Schedule, **Contractor** shall update the Contract Schedule monthly. The update shall reflect progress as of the end of each month. **Contractor** shall submit monthly schedule update to the University's Representative for acceptance with the draft payment application and no later than the tenth day of the following month. The updates shall be made as follows:

1. The Monthly updates shall report progress based upon percent complete of each activity or remaining duration. Actual start dates shall be recorded for those activities that have started. Actual finish dates shall be recorded for those activities that are completed. Activities that are in progress shall reflect an actual start date and the percentage completion for the activity. Actual dates shall be clearly distinguishable from projected dates.

2. The updated Contract Schedule shall reflect an up-to-date status of the contract work as completed, and materials furnished and in permanent place that qualify for payment.

3. The updated Contract Schedule shall reflect Contract Time changes included in all processed change orders for the progress month and each preceding month.

B. Within 5 calendar days after receipt of the updated Contract Schedule in conjunction with the Application for Payment, the University's Representative shall review both and determine which work and material pay items qualify for payment; the approved data will then be returned to the **Contractor** for input. Within 14 calendar days, the **Contractor** and the University's Representative shall meet to review the Construction CPM Schedule and discuss any changes required.

C. The **Contractor** shall then revise and resubmit (if required) the Updated Contract Schedule and Application for Payment to the University's Representative for payment approval.

D. The monthly update shall be calculated using retained logic with a required finish date specified as the current contract completion date. Progress Override calculations shall not be acceptable.

E. No Applications for Payment will be processed, nor shall any progress payments become due until updated Contract Schedules are accepted by University's Representative. The accepted, updated Contract Schedule shall be the Contract Schedule of record for the period it is current and shall be the basis for payment during that period. Acceptance of any updated Contract Schedules shall not relieve **Contractor** from its responsibility to fully complete the Contract within the Contract Time, nor shall it relieve **Contractor** from sole responsibility for any errors in the updated Contract Schedules.

F. **Contractor** shall perform the Work in accordance with the updated Contract Schedule. **Contractor** may change the Contract Schedule to modify the order or method of accomplishing the Work only with prior agreement by the University.

G. With each monthly updated Contract Schedule, the **Contractor** shall provide an accompanying narrative describing the progress anticipated during the upcoming month, critical activities, delays encountered during the prior month, delays anticipated during the upcoming month, and an audit of the Contract Time. The audit shall show current days allowed by contract, days used through the end of the month, days remaining, percent of time used to date, and percent complete as measured by cost loaded schedule, and days ahead of or behind schedule. In the event that the **Contractor** was delayed by any occurrence during the prior month, the narrative report shall include a listing of all delays that affected the critical path and shall clearly explain the impact the claimed delay(s) had on the critical path and shall include an accounting of days lost or gained.

H. In the event the monthly update shows the **Contractor** to be behind schedule (negative float), the narrative shall include a description of actions needed to bring the project back on schedule.

3.05 LOOK AHEAD SCHEDULES

A. Look Ahead Schedule is a schedule derived from the Contract Schedule (or the most current monthly update of the Contract Schedule) which indicates in detail all activities scheduled or worked on for the 1 prior weeks, and all activities scheduled to occur during the next 3 weeks.

B. Provide detailed Look Ahead Schedules every week.

C. Submit in 11-inch by 17-inch Gantt chart format.

D. Look Ahead Schedule shall be generated from the then current Preliminary Contract Schedule, Contract Schedule, or updated Contract Schedule. Activities listed in the Look Ahead Schedule shall reference the activity identification or other such coding for correlation to the activities listed in the Contract Schedule.

3.06 TIME EXTENSION REQUEST DOCUMENTATION

A. In the event the **Contractor** shall request an extension of Contract Time, **Contractor** shall comply with the requirements of the General Conditions, including without limitation, General Conditions Article 8. In addition to the requirements of the General Conditions, as a condition to obtaining an extension of the Contract Time, **Contractor** shall timely submit a sub-network of the events of the delay that demonstrates the impact to the activities in the **Contractor**'s then current schedule, as well as the impact to the overall completion date of the project.

B. If the University's Representative approves the extension of time, the next monthly updated Contract Schedule shall incorporate the subnetwork with the extension of time. In addition, the monthly updated Contract Schedule shall contain all changes mutually agreed upon by the **Contractor** and the University during preceding periodic reviews and all changes resulting from Change Orders and Field Orders.

3.07 AS BUILT SCHEDULE

A. As a condition precedent to the release of retention, the last update of the Contract Schedule submitted shall be identified by the **Contractor** as the "As Built Schedule". The "As Built Schedule" shall be submitted when all activities are 100 percent complete. The "As Built Schedule" shall reflect the exact manner in which the project was actually constructed (including start and completion dates, activities, sequences, and logic) and shall include a statement signed by the **Contractor**'s scheduler that the "As Built Schedule" accurately reflects the actual sequence and timing of the construction of the project.

3.08 WEATHER DAYS ALLOWANCE

A. Should inclement weather conditions, or the conditions resulting from weather, prevent the **Contractor** from proceeding with seventy-five (75) percent of the normal labor and equipment force engaged in the current critical activity item(s), (as shown on the latest CPM Progress Schedule accepted by the University's Representative), for a period of at least five (5) hours per day toward completion of such operation or operations, and the crew is dismissed as a result thereof, it shall be a weather delay day.

B. The expected loss of days specified in the Supplementary Conditions, item 3 “Modification of General Conditions, Article 8 – Contract Time”, shall be included in a separate identifiable critical activity labeled "Weather Days Allowance" to be included as the last critical activity of the project schedule prior to substantial or final completion (whichever is contractual). The weather allowance activity shall be on, and remain on, the critical path of the project throughout the life of the project until it has been absorbed. Typically, all activity’s leading to completion shall go through the weather allowance activity first. When weather days are experienced, and are approved as such by the University’s Representative, the **Contractor** shall either:

1. Increase the duration of the current critical activity(ies) by the number of weather days experienced, or

2. Add a critical activity to the schedule to reflect the occurrence of the weather day(s).

C. The duration of the weather day allowance activity shall be reduced as weather days are experienced and included in the schedule. Any remaining weather days in the weather day allowance activity at the completion of the project shall be considered as float and shall not be for the exclusive use or benefit of either the University or **Contractor**.

D. The **Contractor** shall not receive any additional compensation for unavoidable delays due to inclement or unsuitable weather. If all the weather allowance has been used, any additional weather delay experienced by the **Contractor** may result in a non-compensable time extension upon submission of acceptable supporting documentation to the University’s Representative.

END OF SECTION 01 32 00

SECTION 01 33 00

SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Administrative requirements for shop drawings, product data and samples submittals

B. University's and University's Consultant's review of submittals

C. **Contractor**'s review of submittals

D. Shop Drawing Submittals

E. Product Data submittals

F. Sample submittals

G. Field Samples and mock-ups

H. Submittal Schedule requirements

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK: Subcontractor and materials suppliers list.

B. Section 013200 – CONTRACT SCHEDULES: Submission and review of schedules and submittals.

C. Section 014500 – QUALITY CONTROL: Test and Inspection Reports.

D. Section 016100 - PRODUCT REQUIREMENTS

E. Section 017700 – CLOSEOUT PROCEDURES: Occupancy/Acceptance /Final Payment Submittals.

F. Section 017800 – CLOSEOUT SUBMITTALS: Preparation of Maintenance and Operating Data.

1.03 ADMINISTRATIVE REQUIREMENTS

A. General Submittals Review: Submittals shall be made in accordance with requirements specified herein and in individual Sections.

1. Submittals shall be a communication aid between **Contractor**, University’s Representative, and University's Consultant(s) by which interpretation of Contract Documents requirements may be confirmed in advance of construction.

2. Submit on all products to be used on the Project. Make all submittals through the University unless otherwise directed.

a. The University’s Representative shall provide timely review of submittals and re-submittals.

1) University’s Representative shall have twenty-one (21) days from receipt to review all submittals twenty-one (21) days from receipt to review re-submittals.

2) The Fire Marshal shall have twenty-eight (28) days from receipt to review all submittals twenty-eight (28) days from receipt to review re-submittals.

3) University’s Representative will prepare and keep a log of review time of all submittals.

3. Substitutions shall be submitted in accordance with Section 016100 – PRODUCT REQUIREMENTS.

4. Make submittals sufficiently in advance of construction activities to allow shipping, handling and review by the University's Representative and their consultants.

B. University's and University's Consultants Review: University's Consultant's review will be only for general conformance with the design intent of the Contract Documents. Review of submittals is not conducted for purpose of determining accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the **Contractor** as required by the Contract Documents. Review actions of the University's Consultant or University shall not relieve **Contractor** from compliance with requirements of the Contract Documents. Changes shall only be authorized by separate written Change Order in accordance with the General Conditions of the Contract.

C. Contractors Review: **Contractor** shall review, mark-up as appropriate and stamp Shop Drawings, Product Data, and Samples prior to submission. Submittal shall clearly show it has been reviewed by **Contractor** for conformance with the Contract Documents and for coordination with requirements of the Work. Notify University's Representative in writing, at time of submission, of any changes in the submittals from requirements of Contract Documents.

1.04 SUBMITTAL REQUIREMENTS

A. Prompt Submission: Submittals shall be submitted promptly in accordance with Submittal Schedule and in such sequence as to cause no delay in the Work or in the work of any separate contractor. Present information in a clear and thorough manner to aid orderly review.

B. Preparation: Title each submittal with the University's Project Name and the University's Project number, submittal date and dates of any previous submissions. Clearly mark each copy to identify product or model.

1. Identify each item on submittal by reference to Drawing sheet number, detail, schedule, room number, assembly or equipment number, Specification number Reference Standard (such as ASTM or Fed Spec Number) and other pertinent information to clearly correlate submittal with Contract Documents.

2. Include the names of the **Contractor**, Subcontractor, Supplier and Manufacturer.

3. Include field dimensions, clearly identified as such to establish relationship to adjacent or critical features of the Work or materials.

4. Include pertinent information such as performance characteristics and capacities, wiring or piping diagrams and controls, catalog numbers and similar data.

5. Modify manufacturer's standard schematic drawings and diagrams and other diagrams to delete information not applicable to the Work. Supplement standard information to provide information specifically applicable to the Work.

6. Identify changes from requirements of the Contract Documents.

7. Include 8" x 3" blank space on face of submittal for review stamps.

8. Include **Contractor**'s review stamp, initialed or signed, and dated, certifying to the review of the submittal, verification of materials, field measurements, conditions, and compliance of the information within the submittal with the requirements of the Work and of the Contract Documents.

C. Number of submittals required:

1. Product Data Submittals: Submit PDF electronic file with booked marked table of contents and/or sheet index. Submittals for the Fire Department require an electronic file and two (2) hard copies.

2. Initial/Re-submitted Shop Drawing Review(s): Submit PDF electronic file with booked marked table of contents and/or sheet index. Submittals for the Fire Department require an electronic file and two (2) hard copies.

3. Final Shop Drawing Review and Approval: After obtaining University's Representative approval of initial/re-submitted shop drawing submittals, as described in Section 1.04.C.2 above, **Contractor** shall submit PDF electronic file with booked marked table of contents and/or sheet index. Submittals for the Fire Department require an electronic file and two (2) hard copies. **Contractor** is responsible for providing all approved shop drawings for its use and use by subcontractors and/or suppliers.

4. Samples: Submit number specified. Samples shall be of sufficient size and quality to clearly illustrate the functional characteristics of the products, with integrally

related parts and attachment devices, including full range of colors, textures and patterns.

D. Identifying Submittals: Identify each submittal by Specification section number followed by a number indicating sequential submittal for that Section. Re-submittals shall use the same number as the original submittal, followed by a letter indicating sequential re-submittal. Examples:

1. 092500 – 1 First submittal for Section 092500 – Gypsum Board

2. 092500 – 2 Second submittal for Section 092500 – Gypsum Board

3. 092500 – 2A Re-submittal of second submittal for Section 092500 – Gypsum Board

4. 092500 – 2B Second re-submittal of second submittal for Section 092500 – Gypsum Board

E. Resubmission Requirements: Revise and resubmit as specified for initial submittal. Identify any Changes other than those requested. Note any departures from Contract Documents or changes in previously reviewed submittals.

F. Grouping of Submittals: Unless otherwise specifically permitted by University's Representative, make all submittals in groups containing all associated items as described

in each Specification Section. The University's Representative will reject partial submittals as incomplete.

G. Unsolicited Submittals: Unsolicited submittals will be returned NOT REVIEWED.

1.05 DISTRIBUTION

A. Reproduce and distribute finalized copies of Shop Drawings and Product Data, to the following:

1. **Contractor**'s Project site file.

2. As-built Documents file maintained by **Contractor**.

3. Pertinent Separate Contractors.

4. Pertinent Subcontractors.

5. Pertinent Supplier or Manufacturer.

1.06 FIELD SAMPLES AND MOCK-UPS – **NOT USED**

1.07 SUBMITTAL SCHEDULE

A. Submittals Schedule: refer to Section 013200 – CONTRACT SCHEDULES.

1. The Submittal Schedule is a schedule for submission of Shop Drawings, Product Data and Samples by **Contractor**, and the processing and return of same by University.

2. **Contractor** shall prepare the Submittal Schedule as described herein and coordinate it with the Contract Schedule. No submittals will be processed before the Submittal Schedule has been submitted to and accepted by University.

3. Submittal Schedule shall be adjusted to meet needs of construction process and the Contract Schedule. Submit PDF electronic file with booked marked table of contents and/or sheet index of the Submittal Schedule after it is completed and each time it is updated by **Contractor**.

4. **Contractor** shall NOT begin fabrication or Work which requires submittals until the return of final reviewed and approved submittals have been received by the **Contractor**.

1.08 ENVIRONMENTAL PRODUCT DECLARATIONS

A. Contractor must comply with Buy Clean California Act requirements per California Public Contract Code, Sections 3500-3505.

B. Contractor shall submit to Project Manager/Construction Manager current facility-specific Environmental Product Declaration for each eligible material proposed to be used on the Project.

C. Environmental Product Declaration (EPD): Type III environmental impact label, as defined by the International Organization for Standardization (ISO) standard 14025, or similarly

robust life cycle assessment methods that have uniform standards in data collection consistent with ISO standard 14025, industry acceptance, and integrity.

D. Eligible Materials: Any of the following:

1. Carbon steel rebar.
2. Flat glass.
3. Mineral wool board insulation.
4. Structural steel.

E. Eligible Materials installed on the Project by Contractor must comply with any standards to the extent established in the BCCA or by University, whichever is more stringent. The facility-specific global warming potential for any Eligible Materials must not exceed any existing maximum acceptable global warming potential for that material pursuant to the BCCA or by University, whichever is more stringent ("EM Standards"). The standards are published on the Department of General Services (DGS) website and updated information can be found on this link: https://www.dgs.ca.gov/PD/Resources/Page-Content/Procurement-Division-Resources-List-Folder/Buy-Clean-California-Act

F. Contractor shall not install any eligible materials on the project before submitting a facility-specific Environmental Product Declaration for that material.

G. This section shall not apply to an eligible material for a particular contract if the University determines, upon written justification published on its Internet website, that requiring those eligible materials to comply would be technically infeasible, would result in a significant increase in the project cost or a significant delay in completion, or would result in only one source or manufacturer being able to provide the type of material needed by the state.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 33 00

SECTION 01 34 00

CONTRACTOR(S) EMERGENCY PROCEDURES

PART I - GENERAL

1.01 The purpose of this specification is to outline, to the **Contractor**, the University's policy and procedures for effective project site management of an emergency situation during the construction of projects at UC Davis Health.

1.02 This procedure applies to all Contractors and their subcontractors who have contractual agreements with UC Davis Health.

PART II - DEFINITIONS

2.01 Disaster – any natural or human-made event that causes major disruption such as damage to the organization's buildings or grounds from severe weather conditions, earthquakes, other natural phenomena or loss of utilities (power, water and telephones), acts of civil disobedience, accidents or emergencies within the organization or in the surrounding community.

2.02 Code Green – a code notifying all employees that an emergency event has occurred, and University operations will be opening the Hospital Command Center and shifting to emergency operations.

2.03 Code Red – Fire

2.04 Code White – Hazardous Material / Chemical Spill

2.05 Control Facility – the County of Sacramento has designated UC Davis Health as the Control Facility for Sacramento County. The Control Facility coordinates medical control of patients and victim's dispersal to hospitals in the community/region.

2.06 Other emergency situations include the following systems failures as outlined in the UC Davis Emergency Response Plan.

A. Water system failure
B. Telephone system failure
C. Fire
D. Electrical system failure
E. Security
F. Chemical spill
G. Evacuation

PART III - PROCEDURES

3.01 The **Contractor** will be issued a UC Davis Health Emergency Response Plan at the project

A. Pre-construction meeting. This plan must be posted at the project site at all times in a visible location known to all project contractors.

B. **Contractor** is directed to contact appropriate emergency personnel as outlined in the Emergency Response Plan information during an emergency.

C. If the emergency involves an outside utility company, **Contractor** is to contact utility company directly. Known outside utilities located at the Sacramento campus are as follows.

1. Emergency Telephone Numbers

a.	Police Dispatch:	916-734-2555
b.	PO&M Dispatch (Electrical)	916-734-2763
c.	PG&E (Gas)	800-743-5000
d.	City of Sacramento Water	3-1-1
e.	HazMat Spill	916-734-2740

END OF SECTION 01 34 00

SECTION 01 35 00

SPECIAL PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Interim Life Safety Measures (ILSM)

B. Security Procedures

C. Hazardous Materials Procedures

1.02 RELATED SECTIONS

A. General Conditions of the Contract

B. Section 011100 – SUMMARY OF THE WORK

C. Section 013100 – COORDINATION

D. Section 013200 – CONTRACT SCHEDULES

E. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS

F. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

G. Section 017300 – CUTTING AND PATCHING

H. Section 017400 – CLEANING

1.03 INTERIM LIFE SAFETY MEASURES (ILSM)

A. ILSM Definition: Interim Life Safety Measures are those activities that are undertaken during construction, repair, and improvement operations that are established to temporarily compensate for the deficiencies caused in fire safety and protection that may be associated with such projects.

B. Quality Assurance: Interim Life Safety Measures (ILSM) program shall comply with The Joint Commission Standards, Life Safety (LS) Section, LS.01.02.01.

1. **Contractor** shall be responsible for setting up control procedures to adhere to ILSM Criteria Implementation Matrix and/or the ILSM Inclusion Criteria. Contractors shall notify University's Representative of anticipated and actual problems complying with ILSM.

2. **Contractor** shall submit proposed Fire and Life safety impairments (21) calendar days prior to implementation. Submittal of ILSM does not infer or guarantee acceptance by University. All submitted measures shall be reviewed and returned to **Contractor** indicating approval, approval as noted, or rejection, revision, or re-submittal requirement by University in writing no less than fourteen (15) calendar days prior to proposed implementation. If re-submittal is required, twenty-one (21) day review period from date of re-submittal will be required.

C. Project ILSM Procedures: If a life safety code deficiency occurs, or is identified by any source, or the requirements of the current Life Safety Code are not being met; Interim Life Safety Measures must be implemented to the extent necessary to compensate for any deficient element(s) predicated on magnitude, severity, extent and duration before corrective actions are completed.

Any minor life safety code deficiency that could be corrected within 45 calendar days that is confined to a single smoke compartment or fire zone will not merit for declaring a hospital-wide ILSM(s) but would require reduction in flammable and combustible loads in the affected smoke compartment or zone as well as issuing a work order to complete the Plan For Improvement (PFI) within 45 calendar days of discovery.

The ILSM Criteria Implementation Matrix and/or the ILSM Inclusion Criteria forms completed by a University Representative are used to determine when and to what extent applicable ILSM measures as it pertains to each condition is required to be implemented. Based on the ILSM Inclusion Criteria assessment form, it may not be necessary to declare the need to implement ILSM measures under certain conditions as delineated in the form. When ILSMs are determined to be required, an ILSM Implementation Matrix shall be utilized by the contractor.

ILSMs must be implemented upon project development and must be continuously enforced through project completion. A comprehensive plan of correction is to be developed by the Project Representative, or designee using the ILSM Evaluation Form.

D. Any impairment or shutdown of a passive or active fire and life safety device/system for a period of 4 hours or longer in a 24 hour period will require implementation of an ILSM. Some of the most common impairments are outlined below. The listing of these ILSM examples is not intended to limit or preclude preventative actions that may be required to temporarily compensate for other life safety deficiencies that may arise during construction activities due to unforeseen conditions, the contractor's changing work plan, or required continuing activities of University. Comments following each ILSM are known ILSM requirements at time of bid. These comments are made to assist **Contractor** in bid preparation and later preparation of ILSM plan for the Project. University makes no guarantee these comments address all conditions requiring action by **Contractor**.

1. ILSM example #1: Ensure exits provide free and unobstructed egress. Maintain free and unobstructed access and exits from all buildings to public ways. Maintain

escape facilities for construction workers at all times. Inspect means of egress in construction areas daily.

2. ILSM example #2: Maintain free and unobstructed access to emergency departments/services.

3. ILSM example #3: Ensure fire alarm, detection, and suppression systems are not impaired.

4. ILSM example #4: Ensure temporary construction partitions are smoke tight and built of noncombustible or limit combustible material that will not contribute to the

5. ILSM example #5: Provide additional firefighting equipment and use training for construction workers.

6. ILSM example #6: No smoking. **Contractor** shall follow the Universities smoking policy.

7. ILSM example #7: Develop and enforce storage, housekeeping, and debris removal practices that reduce the flammable and combustible fire load of the building to the lowest level necessary for daily operations.

8. ILSM example #8: Conduct a minimum of two (2) fire drills per shift per quarter.

9. ILSM example #9: Conduct regular hazard surveillance of buildings, grounds, and equipment with special attention to excavations, construction areas, construction storage, and field office.

10. ILSM example #10: Train personnel when structural or compartmentalization features compromise fire safety measures.

11. ILSM example #11: Conduct organization-wide safety education programs to ensure awareness of any LSC (Life Safety Control) deficiencies, construction hazards, and ILSM.

1.04 SECURITY PROCEDURES

A. Security Program: Protect Work, existing premises, and University operations from theft, vandalism, and unauthorized entry.

1. Security of the area shall be strictly maintained. **Contractor** shall control entrance of persons and vehicles related to University operations.

B. Entry Control: Restrict entry of persons and vehicles into Project site and existing facilities. Allow entrance only to authorized persons with proper identification. Maintain log of workers and visitors, make available to University's Representative.

1. **Contractor** shall control entrance of persons and vehicles related to University operations.

C. Personnel Identification: Provide identification card to each person authorized to enter premises, showing: Personal photograph, name and assigned number, expiration date,

and employer. Maintain a list of accredited persons; submit copy to University's Representative on request.

D. Miscellaneous Restrictions: Do not allow cameras on site; do not allow photographs except with written approval of University.

1.05 HAZARDOUS MATERIALS PROCEDURES

A. Except as otherwise specified, should **Contractor** encounter site materials, reasonably believed to be asbestos, polychlorinated biphenyl (PCB), radioactive material, lead in paint, lead lining in walls or glass windows, lead in ceramic products, mold, water leaks or other hazardous materials or conditions, the **Contractor** shall immediately stop work in the affected area and report the condition to University's Representative in writing. The work in the affected area shall not thereafter be resumed except by written agreement of University and **Contractor** if in fact the material is identified as hazardous and has not been rendered harmless. The work in the affected area shall be resumed in the absence of hazardous materials, or when such materials have been rendered harmless.

A. Spills, discharges, overruns, or similar occurrences involving hazardous materials on site shall be promptly reported in writing to University's Representative. If **Contractor** fails to notify University in a prompt and timely manner of an occurrence, University will contract with licensed hazardous materials abatement contractor to clean up the hazardous material. **Contractor** shall pay all costs of removal, including financial penalties incurred, the result of the **Contractor**'s failure to act promptly in response to the product emergency.

C. **Contractor** shall provide means and personnel to contain and control product emergencies or shall provide means and methods to render hazardous materials harmless.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 35 00

Fire Marshal's Office

4800 2nd Ave. #1200
Phone: (916) 734-3036
Fax: (916) 451-7754
hs-fireprevention@ucdavis.edu

Interim Life Safety (ILSM)

Based upon documentation received (ILSM Impact worksheet) a risk analysis of this project has been made. The impairments to life safety systems have been identified and interim measure provided as set forth below.

PROJECT TITLE:		OSHPD #		A/C#	
ILSM START DATE:		END DATE:			
FIRE LIFE SAFETY DEFICENY(IES):					
INTERIM MEASURE(S):					

Unless otherwise noted below, these requirements apply to impairments of a duration extending beyond the current shift (greater than 8 hours)		ILSM1	ILSM2	ILSM3	ILSM4	ILSM5	ILSM6	ILSM7	ILSM8	ILSM9	ILSM10	ILSM11	ILSM12	ILSM13	ILSM14	ILSM15
Check all impairments that apply.																
	Construction activity or repair															
	Any impairment of a required egress															
	Fire detection ALARM system impairment **greater than 4 hours *****															
	Fire SUPPRESSION system impairment **greater than 10 hours**															
	Fire &/or smoke door hardware impaired															
	Fire or smoke barriers with impairment															
	Missing or incomplete fire or smoke barriers															
	OTHER: *See below*															

**** Requires inspection by The Fire Marshal's Office prior to ILSM commencement.**

***** Fire Watch shall be documented and log provided to the Fire Marshal's Office at the end of each fire watch shift*****

Daily Inspection Log shall be completed by construction team daily & Fire Prevention staff weekly

INTERIM LIFE SAFETY IMPLEMENTATION MEASURES	
ILSM 1	Life safety deficiencies have been evaluated per UCDH Policy 1635 based upon the submitted ILSM Impact Worksheet
ILSM 2	Policy for deficiencies is followed for a sprinkler system out of service more than 10 hours in a 24 hour period & fire alarm out of service for more than 4 hours in a 24 hour period.
ILSM 3	Post signage identifying the location of alternative exits to everyone affected
ILSM 4	Inspect exits in affected area on a daily basis
ILSM 5	Provide temporary but equivalent fire alarm & detection system for alarm impairment
ILSM 6	Provide additional fire fighting equipment (i.e. fire extinguishers)
ILSM 7	Temporary construction barrier smoke-tight, will not contribute to the development of fire & of solid construction (see UCDH Policy 1635 & OSHPD 9-3301)
ILSM 8	Increase surveillance of building, special attention to construction area & storage
ILSM 9	Enforce storage, housekeeping & debris removal practices to reduce fire load
ILSM 10	Provide additional training to those who work in the hospital on the use of firefighting equipment
ILSM 11	Conduct one additional fire drill per shift per quart.
ILSM 12	Inspect & test *temporary* systems monthly. -Document testing
ILSM 13	Conduct education to promote awareness of building deficiencies, hazards & temporary measures
ILSM 14	Train those who work in the hospital to compensate for impaired structural or compartmental fire safety features
ILSM 15	OTHER:

Responsible Individual Signature: Date:	Fire Marshal's Office Signature: Date:

Fire Marshal's Office

4800 2nd Ave. #1200
Phone: (916) 734-3036
Fax: (916) 451-7754
hs-fireprevention@ucdavis.edu

Interim Life Safety (ILSM)

DAILY INSPECTION LOG

This list is not a comprehensive list of all items inspected and maintained for safey during construcion.

Address or room identification is clearly visible	Ensure alternative Exit signage is visible
Check fire extinguishers are current and visible	Smoke detectors bagged at start & unbagged at end of work day *Coordinate with Aux so as to not roll Fire Trucks
Clear debris from site	Construction barrier is intact and doors latch
Ensure all exits are unobstructed	Sprinklers are protected & any shut down is under 10 hours *Coordinate with PO & M and Aux Services

Contractor	Inspector	Comments
Walk each area indicated by the ILSM and ensure measures are in place.	Review the progress and verify the responsible parties adhere to ILSM provisions.	
Effective Dates:	Effective Dates:	
Daily - Initial and Date	**Weekly – Initial and Date**	

UC Davis Health
Fire Marshal's Office
4800 2nd Ave., Suite 1200
Sacramento, Ca 95817
916-734-3036
hs-fireprevention@ucdavis.edu
www.ucdmc.ucdavis.edu/fire/

Interim Life Safety Measure (ILSM)
Impact Worksheet

This form is completed by the Project Manager or Contractor or Contractor's Representative. Complete the form and submit to the Fire Marshal's Office for an evaluation of the need for an ILSM, Fire Watch, or other safety measure.

Project Title:			
Date of Project(s):		Time of Project(s):	
A/C#		OSHPD #	
Project Description:			

	Yes	No
Project alters or significantly compromises exit access, exiting, or exit discharge building elements? If yes, provide a floor plan showing how exiting is affected. Temporary exit and/or evacuation signs may be required.	☐	☐
Compromise of building compartmentation including fire or smoke walls, floor / ceiling assemblies, corridor walls, use area doors, or other defend in place elements? If yes, describe in information.	☐	☐
The issue impairs the building fire alarms or sprinkler systems?	☐	☐
The activity includes significant ignition sources such as cutting, welding, or other operations using flame or producing sparks?	☐	☐
The activity includes large quantities of combustible materials, flammable materials, or generation of large amounts of dust and debris?	☐	☐
Access to fire or life safety equipment affected? If yes, what systems or equipment? (i.e.: fire watch, Fire Inspector, extinguisher, etc.)	☐	☐
Are construction barriers present / required?	☐	☐

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Documentation – When ILSMs are required, the following documentation must be maintained:

a. Training rosters
b. Fire drill reports
c. Monthly inspection and testing of temporary fire alarm, detection, and suppression systems
d. Daily inspection of construction area
e. Weekly inspection of buildings, grounds, and equipment with special attention to excavations, construction areas, construction storage, and field offices
f. Completed ILSM form at the job site

Note* Contractor activities that pose an immediate threat to the health and safety or patients, visitors, hospital employees or construction personnel shall be discontinued immediately until the hazards are abated and corrected and the appropriate ILSM(s) are developed.

Requestor's Signature	Date
UCDH Fire Marshal's Office Representative	Date

Information:

I.L.S.M.

Interim Life Safety Measures Requirement Verification Card

Contractor	Inspector	Fire Marshal	Comments
Walk each area indicated by the ILSM and ensure measures are in place. Effective Dates	Review the progress and verify the responsible parties adhere to ILSM provisions. Effective Dates	Fire Marshal has visited the site and reviewed the program with the responsible parties	
Daily -Initial and Date	**Weekly – Initial and Date**	**Monthly – Initial and Date**	

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Relationship between Code, Ordinances, Standards and Contract Documents

B. Applicable Codes, Laws and Ordinances

C. Project Inspections

D. California State Fire Marshal Requirements

E. Department of Health Care Access and Information Projects

1.02 RELATED SECTIONS

A. Section 013500 – SPECIAL PROCEDURES

B. Section 014200 – REFERENCES

C. Section 014500 – QUALITY CONTROL

1.03 RELATIONSHIP BETWEEN CODES, ORDINANCES, STANDARDS AND THE CONTRACT DOCUMENTS

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

B. Precedence:

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

2. Where Contract Drawings or Contract Specifications require or describe products or execution of better quality, higher standard or greater size then required by applicable codes, ordinances and standards, the Contract Drawings and Contract Specifications shall take precedence so long as such increase is legal.

3. Where no requirements are identified in Contract Documents, comply with all requirements of applicable codes, ordinances and standards of governing authorities having jurisdiction.

1.04 APPLICABLE CODES, LAWS AND ORDINANCES

A. Building Codes, Laws, and Regulations:

1. Work shall meet or exceed the requirements of and be performed in accordance with applicable, adopted code requirements, laws and requirements of all other regulatory agencies, including, but not limited to the following:

a. California Code Series - 2022 Edition

1) California Administrative Code, California Code of Regulations – Title 24, Part 1

2) California Building Code, California Code of Regulations – Title 24, Part 2, Volume 1& 2

3) California Electrical Code, California Code of Regulations – Title 24, Part 3

4) California Mechanical Code, California Code of Regulations – Title 24, Part 4

5) California Plumbing Code, California Code of Regulations – Title 24, Part 5

6) California Energy Code, California Code of Regulations – Title 24, Part 6

7) Elevator Safety Construction Code, California Code of Regulations – Title 24, Part 7

8) California Historical Building Code, California Code of Regulations – Title 24, Part 8

9) California Fire Code, California Code of Regulations – Title 24, Part 9

10) California Existing Building Code, California Code of Regulations – Title 24, Part 10

11) California Referenced Standards Code, California Code of Regulations – Title 24, Part 12

b. NFPA Code Series. National Fire Protection Association (NFPA) (as adopted by State agencies)

1) NFPA 13 – Standard for the Installation of Sprinkler Systems.

2) NFPA 14 – Standard for the Installation of Standpipe and Hose System

3) NFPA 72 – National Fire Alarm and Signaling Code

4) NFPA 80 – Standard for Fire Doors and Other Opening Protectives

5) NFPA 99 – Health Care Facilities Code

6) NFPA 101 – Life Safety Code

7) NFPA 252 – Standard Methods of Fire Tests of Door Assemblies

8) NFPA 701 – Standard Methods of Fire Tests of Flame Propagation of Textiles and Films

c. California Code of Regulation Series (embodied in California model codes as noted above)

1) Title 8, Industrial Relations

2) Title 17, Public Health (Chapter 7)

3) Title 19, Public Safety

4) Title 21, Public Works

5) Title 22, Social Security

6) Title 24, Parts 1, 2, 3, 4, 5, 9 and 12

7) Title 25, Energy Insulation Standards

d. Americans with Disabilities Act (ADA) 2010 (Federal Law)

e. Rules and regulations of private and public utilities

f. American National Standards Institute (ANSI)

g. American Society of Testing Materials (ASTM)

h. Federal Specifications (Fed. Spec.)

i. Underwriters Laboratories

j. Traffic controls per California MUTCD requirements

2. All dates to comply with editions adopted and accepted by University and California State Fire Marshal (CSFM).

3. 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 latest edition of each in effect at the date of submission of bids, or the date of the Change Order, as applicable.

4. References on Drawings or in Specifications to "code" or "building code' 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.

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 local governmental agencies and jurisdictions having authority over the Project.

2. Work shall be accomplished in conformance with all regulations of Public Utilities and utility districts.

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 Contract Time or Contract Sum, except where changes in laws, ordinances, rules and regulations occur subsequent to execution date of the Agreement.

4. General **Contractor** shall not self-perform specialty contracting work defined in sections 7055 – 7059.1 of the California Business and Professions Code unless the General **Contractor** has the specialty contractor’s license appropriate for the work performed. Otherwise, specialty contractors shall be retained by the **Contractor** to perform specialty work identified in the project scope.

1.05 PROJECT INSPECTIONS

A. Provision of inspectors by University, if any, or by Department of Health Care Access and Information pursuant to this Section and Section 1.04 above shall be subject to the following:

1. **Contractor** shall allow inspectors full access to Project at all times.

2. **Contractor** shall not take any direction, approvals or disapprovals from inspectors.

3. **Contractor** shall not rely on inspectors to ensure Work is completed in accordance with Contract Documents.

4. Acts of omissions of any inspector (including without limitation inspector's failure to observe or report deficiencies in **Contractor**'s Work) shall not relieve **Contractor** for responsibility to complete Work in accordance with Contract Documents.

1.06 DEPARTMENT OF HEALTH CARE ACCESS AND INFORMATION PROJECTS

A. Department of Health Care Access and Information (HCAI) is the agency having jurisdiction over all acute care medical project design and construction unless a Memorandum of Understanding (MOU) has been established assigning University staff to perform regulatory duties.

B. HCAI will approve an inspector for the Project who shall have full access to the Project at all times.

C. HCAI will require Verified Report forms to be filed per testing, inspection and observation form during construction and a final verified report at completion of the project. Separate verified reports are required from Consultants, Project Inspector, and **Contractor**.

D. HCAI will require a Building Permit for project submitted by University's Representative. No HCAI Building Permit fees are required to be paid by the **Contractor**.

E. HCAI will require Change Order Approval submitted by University's Representative.

F. HCAI will require a Licensed **Contractor**'s Declaration from the **Contractor**.

G. HCAI projects shall comply with the 2016 California Administration Code.

1.07 DEFERRED APPROVAL

A. Where noted in the Contract Documents, certain items of materials and/or systems may require HCAI/CSFM deferred approval pending submittals of shop drawings. For these items, **Contractor** shall submit details and structural calculations for anchorage, to comply with State of California Code of Regulations Title 24, table T17-23-J. Calculations shall be made by a licensed Structural Engineer registered in the State of California.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 41 00

SECTION 01 42 00

REFERENCES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Definitions and terms used in Contract Documents

B. Reference Standards used in Contract Documents

C. Common abbreviations and acronyms which may be used in Contract Documents

1.02 RELATED SECTIONS

A. Section 014100 – Regulatory Requirements

1.03 DEFINITIONS OF TERMS

A. Basic Contract Definitions: Words and terms governing the Work are defined in the General Conditions of the Contract, provided in the Contract Documents.

B. Additional words and terms are 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): Used in conjunction with action on submittals, applications, and requests, is limited to duties and responsibilities stated in the General Conditions. Approvals shall only be valid if obtained in writing and shall not apply to matters regarding the means, methods, techniques, sequences and procedures of construction. Approval shall not release **Contractor** from responsibility to fulfill Contract requirements.

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

4. By others: Work on the project that is outside the scope of Work to be performed under the Contract, but that will be performed by University, separate contractors or other means.

5. **Contractor**-Furnished/University-Installed (CFUI): Items, systems or equipment purchased by the **Contractor** as part of the project and handed over to the University for installation.

6. Construction Site: Same as site.

7. Directed: As instructed by University or University's Representative, 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 University's Representative", requested by University's Consultant" or University's Representative and similar phrases. No implied meaning shall be interpreted to extend the University's Representative responsibility into **Contractor**'s supervision of construction.

8. Equal or Equivalent: As determined by the University's Consultant as being of the same quality, appearance, utility, durability, finish, function, suitability, and performance.

9. Furnish: Means "supply and deliver, ready for unloading, unpacking, assembly, installation, and similar operations".

10. Indicated: Refers to graphic representations, notes or schedules on Drawings, or Paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used, it is to help locate the reference.

11. Install: Describes operations at the site including unloading, unpacking, assembly, erection, anchoring, applying, working to dimension, protecting, cleaning, and similar operations.

12. Installer: "Installer" is the **Contractor** or an entity engaged by the **Contractor**, as an 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.

    a. Experienced Installer: The term "experienced", when used with "installer" means having a minimum of five (5) previous Projects similar in size to this Project, and familiar with the precautions required, and with requirements of the authority having jurisdiction.

13. Jobsite: Same as site.

14. Necessary: as determined in the professional judgement of the University Representative through the University's Consultant as being necessary for the Work, in conformance with the requirements of the Contract Documents, and

excluding matters regarding the means, methods, techniques, sequences and procedures of construction.

15. Noted: Same as indicated.

16. Owner-Furnished/**Contractor**-Installed (UFCI): Item, system or equipment furnished by University at its cost and installed by the **Contractor** as part of the Work.

17. Per: In accordance with or in compliance with.

18. Products: Materials, systems or equipment.

19. Project site: Same as site.

20. Proper: As determined by the University's Representative 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.

21. Provide: Means "furnish and install, complete and ready for use".

22. Regulation: Includes laws, ordinances, statutes and lawful orders issued by authorities having jurisdiction, and rules, conventions and agreements within the construction industry that control performance of the Work, whether lawfully imposed by authorities having jurisdiction or not.

23. Required:

    a. As required by regulatory requirements of governing authorities.

    b. As required by referenced standards.

    c. As required by existing job conditions.

    d. As generally provided by accepted construction practices of the locale.

    e. As indicated on the Drawings and in the Specifications.

    f. As otherwise required by the Contract Documents.

24. Scheduled: Same as indicated.

25. Selected: As selected by University's Representative or University's Consultant from the full national product selection of the manufacturer, unless otherwise specifically limited in the Contract Documents to a particular quality, color, texture or price range.

26. Shown: Same as indicated.

27. 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.

28. Testing Laboratories: Same as Testing and Inspection Agency.

29. Testing and Inspection 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.

30. University-Furnished/**Contractor**-Installed (UFCI): Same as Owner-Furnished/**Contractor**-Installed.

1.04 REFERENCE STANDARDS

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 Sections of the 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 in the Drawings or 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. It is the responsibility of the **Contractor**, subcontractors, manufacturers, suppliers, trades and crafts to be familiar with these generally recognized standards of the construction industry.

E. Jobsite Copies:

1. **Contractor** shall obtain and maintain at the Project site copies of reference standards identified on the Drawings and in the Specifications in order to properly execute the Work.

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 Contract.

2. 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 the responsibility of the

Contractor to be familiar with and have access to these nationally, and industry recognized specifications and standards.

1.05 ABBREVIATIONS & ACRONYMS

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

B. Refer also to the "Encyclopedia of Associations", published by Gale Research Co., available in most libraries.

C. The following are commonly used abbreviations which may be found on Contract Drawings and in Contract Specifications:

AA	Aluminum Association
AAA	American Arbitration Association
AAC	Architectural Anodizers Council
AABC	Associated Air Balance Council
AAMA	American Architectural Manufacturers Association
AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
ACPA	American Concrete Pumping Association
ADA	Americans with Disabilities Act
ADC	Air Diffusion Council
AFSA	American Fire Sprinkler Association
AGA	American Galvanizers Association (formerly AHDGA)
AGA	American Gas Association
AGC	Associated General Contractors of American
AI	Asphalt Institute
AIA	American Institute of Architects
AIMA	Acoustical and Insulation Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	Air Movement and Control Association International
ANSI	American National Standards Institute
APA	Engineered Wood Association (formerly American Plywood Association)
APWA	American Public Works Association
ARMA	Asphalt Roofing Manufacturers Association
ASAC	American Subcontractors Association of America
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers
ASLA	American Society of Landscape Architects
ASME	American Society of Mechanical Engineers
ASNT	American Society for Nondestructive Testing
ASPE	American Society of Plumbing Engineers
ASTM	American Society for Testing and Materials
AWI	Architectural Woodwork Institute
AWPA	American Wood Preservers' Association
AWS	American Welding Society
AWWA	American Water Works Association
BHMA	Builders Hardware Manufacturers Association
BOC	Board of Corrections
CABO	Council of American Building Officials
CAC	California Administrative Code (see California Code of Regulations (CCR)
CAL/OSHA	State of California Construction Safety Orders
CBC	California Building Code
CCR	California Code of Regulations
CEC	California Electrical Code
CFC	California Fire Code
CFR	Code of Federal Regulations
CIMA	Construction Industry Manufacturers Association
CISPI	Cast Iron Soil Pipe Institute
CLFMI	Chain Link Fence Manufacturers' Institute
CMC	California Mechanical Code

CPC	California Plumbing Code
CRSI	Concrete Reinforcing Steel Institute
CSI	Construction Specifications Institute
CTIOA	Ceramic Tile Institute of America, Inc.
DHI	Door and Hardware Institute
DSA	Division of the State Architect
EJMA	Expansion Joint Manufacturers Association
FGMA	Flat Glass Marketing Association
FM	Factory Mutual Research Organization
FS	Federal Specification (from GSA)
GA	Gypsum Association
GSA	General Services Administration
HCAI	Department of Health Care Access and Information (State of California)
IAPMO	International Association of Plumbing and Mechanical Officials
IEEE	Institute of Electrical and Electronics Engineers, Inc.
ISO	International Organization for Standardization
MIA	Masonry Institute of America
ML/SFA	Metal Lath/Steel Framing Association
MM	State of California, Business and Transportation Agency, Department of Transportation, "Materials Manual"
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry
NAAMM	National Association of Architectural Metal Manufacturers
NEC	National Electrical Code
NECA	National Electrical Contractors Association
NEMA	National Electrical Manufacturers Association
NFC	National Fire Code
NFPA	National Fire Protection Association
NFSA	National Fire Sprinkler Association
NGA	National Glass Association
NIBS	National Institute of Building Sciences
NIST	National Institute of Standards and Technology
NPCA	National Precast Concrete Association
NRCA	National Roofing Contractors Association
NSC	National Safety Council
NSF	National Sanitation Foundation
NSPE	National Society of Professional Engineers
NTMA	National Terrazzo and Mosaic Association
NWMA	National Woodwork Manufacturers Association
OSHA	Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Precast/Prestressed Concrete Institute
PDCA	Painting and Decorating Contractors of America
PDI	Plumbing and Drainage Institute
PS	Product Standard (U.S. Department of Commerce)
RIS	Redwood Inspection Service
SDI	Steel Deck Institute
SFM	State Fire Marshal (California)
SFPE	Society of Fire Protection Engineers
SGCC	Safety Glazing Certification Council
SIGMA	Sealed Insulating Glass Manufacturers Association
SJI	Steel Joist Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Society for Protective Coatings (Steel Structure Painting Council)
SSPWC	Standard Specifications for Public Works Construction
SWRI	Sealant, Waterproofing and Restoration Institute
TCA	Tile Council of America
TJC	The Joint Commission
UBC	Uniform Building Code
UFC	Uniform Fire Code
UL	Underwriters Laboratories, Inc.
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USS	United States Standard
WCLIB	West Coast Lumber Inspection Bureau
WIC	Woodwork Institute of California
WWPA	Western Wood Products Association

D. Words and terms not otherwise specifically defined in this Section or in the Contract Documents, shall be as customarily defined by trade or industry practice, by reference

standard and by specialty dictionaries such as Dictionary of Architecture and Construction (Cyril M. Harris, McGraw-Hill Educational; 4th Edition, September 5, 2005).

E. Additional abbreviations, used on the Drawings, are listed thereon.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 42 00

SECTION 01 45 00

QUALITY CONTROL

PART I - GENERAL

1.01 SECTION INCLUDES

A. **Contractor**'s Quality Control

B. Quality of the Work

C. Inspections and tests by governing authorities

D. Inspections and tests by serving utilities

E. Inspections and tests by manufacturer's representatives

F. Inspections and Independent testing and Inspection Laboratories/Agencies

G. **Contractor's** responsibilities in inspections and tests

H. **Contractor's** responsibilities regarding the University's testing laboratory

I. Test reports

J. Geotechnical engineer

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 014100 – REGULATORY REQUIREMENTS: Compliance with applicable codes, ordinances and standards.

C. Section 014550 – INSPECTION and TESTING of WORK

D. Section 016100 – PRODUCT REQUIREMENTS: Product Options, substitutions, transportation and handling requirements, storage and protection requirements, and system completeness requirements.

1.03 [CONTRACTOR'S] [CM/CONTRACTOR'S] QUALITY CONTROL

A. **Contractor**'s Quality Control: **Contractor** shall ensure that products, services, workmanship and site conditions comply with requirements of the Contract Documents 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 Contract Documents, including, by reference, all Codes, laws, 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. Quality Control Personnel: **Contractor** shall employ and assign knowledgeable and skilled personnel as required by contract or necessary if not prescribed to perform quality control functions to ensure the Work is provided as required.

1.04 QUALITY OF THE WORK

A. Quality of Products: Unless otherwise indicated or specified, 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 and adjacent construction.

C. Protection of Completed Work: Take all measures necessary to preserve completed Work free from damage, deterioration, soiling and staining, until Acceptance by 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 (ICC) requirements in preparing, fabricating, erecting, installing, applying, connecting and finishing Work.

E. Deviations from Standards and Code Compliance and Manufacturer's Instructions and Recommendations: 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 deviation is acceptable and appropriate for the Project.

F. Verification of Quality: Work shall be subject to verification of quality by University's Representative and University's Consultant in accordance with provisions of the General Conditions of the Contract.

1. **Contractor** shall cooperate by making Work available for inspection by University's Representative, University's Consultant or their designated representatives.

2. Such verification may include mill, plant, shop, or field inspection as required.

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

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

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

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

H. Limitations on Inspections, Tests and Observations: Neither employment of independent testing and inspection agencies nor observations by University's Consultant and their consultants shall relieve **Contractor** of obligation to perform Work in full conformance to all requirements of Contract Documents.

I. Acceptance and Rejection of Work: University's Representative reserves the right to reject all Work not in conformance to the requirements of the Contract Documents.

1. If initial tests or inspections made by University's Testing Laboratory or Geotechnical Engineer reveal any portion of the Work fails to comply with Contract Documents, or if it is determined that any portion of Work requires additional testing or inspection, additional tests and inspections shall be made as directed by University's Representative.

2. If such additional tests or inspections establish such portions of the Work comply with Contract Documents, all costs of such additional testing or inspection will be paid by University.

3. If such additional tests or inspections establish such portions of the Work fail to comply with Contract Documents, all costs of such additional tests and inspection shall be deducted from the Contract sum.

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

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

L. Contract Adjustment for Non-conforming Work: Should University or University's Consultants determine it is not feasible or 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 and **Contractor**. If equitable reduction in Contract Sum cannot be agreed upon, a Directed Change Order will be issued and the amount in dispute resolved in accordance with applicable provisions of the General Conditions of the Contract.

1.05 INSPECTIONS AND TESTS BY GOVERNING AUTHORITIES

A. Regulatory Requirements for Testing and Inspection: Comply with California Building Code (CBC) requirements and all other requirements of governing authorities having jurisdiction.

B. Inspections and tests by governing Authorities: **Contractor** shall cause all tests and inspections required by governing authorities having jurisdiction to be made for Work under this Contract.

1. Such authorities include University's Building Inspection (code compliance), University's Fire Marshal’s office and similar agencies.

1.06 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 this Contract. Scheduling, conducting and paying for such inspections shall be solely the **Contractor**'s responsibility.

1.07 INSPECTIONS AND TEST BY MANUFACTURER'S REPRESENTATIVES

A. Inspections and Tests by Manufacturer's Representatives: **Contractor** shall cause all tests and inspections specified to be conducted by materials or systems manufacturers, to be made. Additionally, all tests and inspections required by materials or systems manufacturers as condition of warranty or certification of Work shall be made, the cost of which shall be included in the Contract Sum. Manufacturer’s Representatives shall provide a PDF electronic report indicating but not limited to work or materials that are missing, not installed correctly, damaged or need correction. Manufacturer’s Representatives shall issue a final PDF electronic report once all work and materials are installed correctly, functioning and in compliance with the Manufacturer’s Warranty.

1.08 INSPECTION BY INDEPENDENT TESTING AND INSPECTION LABORATORIES

A. Definitions:

1. The term "University's Testing Laboratory" means a testing laboratory retained and paid for by University for the purpose of reviewing material and product reports, performing material and product testing and inspection, and other services as determined by University.

B. University will select an independent testing and inspection laboratory or agency to conduct tests and inspections as called for in the Contract Documents and as required by governing authorities having jurisdiction.

1. Responsibility for payment for tests and inspection shall be as indicated in the schedule below. All time and costs for **Contractor**'s services related to such tests and inspections shall be included in Contract Time and Contract Sum.

C. **Contractor** shall notify University, and if directed by University's Representative testing and inspection laboratory, when Work is ready for specified tests and inspections.

D. **Contractor** shall pay for all additional charges by testing and inspection agencies and governing authorities having jurisdiction due to the following:

1. **Contractor**'s failure to properly schedule or notify testing and inspection agency or authority having jurisdiction.

2. Changes in sources, lots or suppliers of products after original tests or inspections.

3. 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 and mortar after review and acceptance of submitted mix design. Test and inspections shall include, but not be limited to, the following:

List the applicable services required, for example:

Material Inspections and Tests		Paid by:
Concrete Reinforcement	Reinforcement Inspection	University
	Reinforcement Strength	University
Cast in Place	Slump Tests	University
	Compressive Strength Tests	University
Structural Steel	Welding Inspection	University
	High Strength Bolting Inspection	University

F. Test and Inspection Reports: After each inspection and test, one (1) PDF electronic report shall be promptly submitted to University's Representative, **Contractor** and to agency having jurisdiction (if required by code).

1. Reports shall clearly identify the following:

   a. Date issued

   b. Project name and Project number

   c. Identification of product and Specification Section in which Work is specified

   d. Name of inspector

   e. Date and time of sampling or inspection was conducted

   f. Location in Project where sampling or inspection was conducted

   g. Type of inspection or test

   h. Date of tests

   i. Results of tests

   j. Comments concerning conformance with Contract Documents and other requirements

2. Test reports shall indicate specified or required values and shall include statement whether test results indicate satisfactory performance of products.

3. Samples taken but not tested shall be reported.

4. Test reports shall confirm that methods used for sampling and testing conform to specified test procedures.

5. When requested, testing and inspection agency shall provide interpretations of test results.

6. Verification reports shall be prepared and submitted, stating tests and inspections specified or otherwise required for Project, have been completed and material and workmanship comply with the Contract Documents. Verification reports shall be submitted at intervals not exceeding six (6) months, at Substantial Completion of the Project, and at all times when Work of Project is suspended.

1.09 CONTRACTOR RESPONSIBILITIES IN INSPECTIONS AND TESTS

A. Tests, inspections and acceptances of portions of the Work required by the Contract Documents or by Applicable Code Requirements shall be made at the appropriate times. Except as otherwise provided, **Contractor** shall notify University's Representative to make arrangements for such tests, inspections and acceptances. **Contractor** shall give University's Representative timely notice of all required inspections as outlined in Specification Section 014550 – INSPECTION and TESTING of WORK, Item 1.05, Scheduling Inspections – Notification Requirements.

B. If such procedures for testing, inspection or acceptance reveal failure of any portion of the Work to comply with requirements of the Contract Documents, **Contractor** shall bear all costs made necessary by such failure including those of repeated procedures, including compensation for University's Consultant's services and expenses.

C. If University and/or University's Consultants are to observe tests, inspections or make acceptances required by the Contract Documents, University and/or University's Consultant will do so promptly and, where practicable, at the normal place of testing.

D. Cooperate with testing and inspection agency personnel, University, University's Consultant's and their consultants. Provide access to Work areas and off-site fabrication and assembly locations, including during weekends and after normal work hours.

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

1.10 CONTRACTOR RESPONSIBILITIES REGARDING UNIVERSITY TESTING LABORATORY

A. Secure and deliver to University's Testing Laboratory adequate quantities of representative samples of materials proposed for use as specified.

B. Submit to University's Representative the preliminary design mixes proposed for concrete and other materials, which require review, by University's Consultants and/or University’s Testing Laboratory.

C. Submit copies of product test reports as specified.

1.11 TEST REPORTS

A. University's Testing Laboratory shall submit one (1) PDF electronic copy of all reports to the University's Representative, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.

1.12 University will distribute one (1) PDF electronic copy of the reports to University's Consultants and **Contractor**. GEOTECHNICAL ENGINEER

A. University will retain and pay the expense of a Geotechnical Engineer to perform inspection, testing and observation functions specified by University. Geotechnical

Engineer will communicate only with University. University's Representative shall then give notice to **Contractor**, of any action required of **Contractor**.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 45 00

SECTION 01 45 50

INSPECTION AND TESTING OF WORK

PART I - GENERAL

1.01 SECTION INCLUDES

A. Project Inspections and Procedures

B. Scheduling Inspectors – Notification requirements

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013200 – CONTRACT SCHEDULES

C. Section 013500 – SPECIAL PROCEDURES

D. Section 014100 – REGULATORY REQUIREMENTS

E. Section 014500 – QUALITY CONTROL

1.03 DEFINITIONS

A. IOR: Inspector-of-Record

B. ACO: Area Compliance Officer for HCAI

C. DSE: District Structural Engineer for HCAI

D. FM: Fire Marshal (may include both HCAI FM and State FM)

E. TL: Testing Laboratory

1.04 PROJECT INSPECTIONS AND TESTING PROCEDURES

A. Inspections: This Project (is) (is not) under the jurisdiction of the Department of Health Care Access and Information. The following inspections will be requested on this project, as appropriate. Also see Part 3 for non-HCAI inspection items or Part 3, Item 3.11 for HCAI requirements.

1. Inspections required by the California Building Code

2. Inspections listed on the Testing, Inspection and Observation (TIO) form

3. Final inspections

B. Procedures: University's Representative shall be the **Contractor**'s contact for all inspection requests. **Contractor** shall fill out Inspection Request Form for all inspections.

1. **Contractor** shall properly plan and coordinate inspection requests. Schedule delays caused by **Contractor**'s failure to plan and/or coordinate inspection requests will not be considered for adjustments to Contract Time or Contract Sum.

2. A complete set of HCAI/SFM stamped and approved Contract Drawings and Contract Specifications, including applicable shop drawings and building permit shall be available on site for review by the Inspector-of-Record. The **Contractor**, Subcontractors and other responsible parties shall be present during inspection walk-throughs. All areas of project scope shall be ready and accessible for inspection. **Contractor** shall provide access equipment as applicable for the inspector's needs.

3. A complete set of codes referred to in the approved plans must be maintained on the job at all times.

4. **Contractor** shall submit verified compliance reports as outlined in the California Administrative Code, Section 7-151.

1.05 SCHEDULING INSPECTIONS –NOTIFICATION REQUIREMENTS

A. Advance Inspection Notification: University's Representative for this project requires the following advance notifications to schedule appropriate inspection agencies at the project site.

1. IOR Inspection Request Notification: Twenty-four (24) hours. Note: Inspection requests received by 2:00 PM will be scheduled for next day inspection. Inspection requests received after 2:00 PM will be scheduled for the following day; (example: Inspection request received at 2:01 PM on a Monday would be scheduled for inspection on Wednesday). Weekend and off-hours inspection requests will be scheduled on a case-by-case basis with a minimum of seventy-two (72) hour inspection request notification.

2. HCAI Field Compliance Inspectors: Fourteen (14) calendar days.

3. Testing Laboratory Inspections: Forty-eight (48) hours.

   a. All testing laboratory and testing procedures must be scheduled by University's Representative. Inspections and/or testing directly scheduled by **Contractor** will not be accepted.

   b. **Contractor** will bear all costs associated with unauthorized inspections and testing.

4. State Fire Marshal Inspection Request Notification: Seventy-two (72) hours.

B. Methods of Inspection Notification:

1. All inspection notifications shall be in writing using inspection forms located at back of this Section. Incomplete forms will be returned as non-compliant, and no inspection will be scheduled until all required inspection information is provided.

2. Emailed inspection requests will be accepted. University's Representative email address is lfuka@ucdavis.edu Notification time begins from the date and stamp of the email, provided it is sent during normal business hours. Emailed inspection requests sent after normal business hours and/or received on non-normal workdays, as defined in Specification Section 013100 – COORDINATION, paragraph 1.07.F.4.A will begin notification time starting at 7:00 AM the following normal business day.

C. Off-hours Inspection Requests: **Contractor** shall provide time windows for all off-hour or other than normal work hour inspections. University's Representative shall have final authority in setting times of off-hour inspections.

D. Re-inspections:

1. More than two (2) re-inspections: The cost of re-inspections of the same work, more than twice, shall be deducted from Contract Sum. IOR's hourly rates are $153.00 per hour during normal work hours and $229.50 per hour for all off-hour inspections. University will provide itemized invoice for **Contractor**'s records.

2. Work unprepared for inspection: Re-inspections of the same work scheduled by **Contractor**, but not ready for inspection will be identified as a re-inspection.

PART II - PRODUCTS – Not Applicable to this Section.

PART III - EXECUTION

Note: Part 3 describes typical inspection requirements for each individual inspector's jurisdiction for non-HCAI projects. Part 3 is provided as a reference source for **Contractor**'s use and Scheduling, as applicable. Part 3 is not intended to be all-inclusive and **Contractor** shall verify actual inspection requirements needed for this project. See Item 3.11 for Testing, Inspection Observation for HCAI.

3.01 FIRE DAMPERS (Title 24, Part 2, Chapter 43)

Note: Manufacturer's installation instructions shall be used for inspections and testing.

A. 1 Hour: IOR test 100%. State Fire Marshal tests 100% or as needed.

B. 2 Hour: IOR tests 100%. State Fire Marshal tests 100%.

C. Smoke: IOR tests 100%. State Fire Marshal tests 100%.

3.02 FIRE SPRINKLERS (Title 24, Part 2, Volume 1, Chapter 9; NFPA Bulletin 13)

A. Approved drawings shall be on jobsite from start to completion of project.

B. Underground pressure test @ 200 psi.

C. State Fire Marshal to witness installation of underground lines.

D. State Fire Marshal to witness underground flush prior to connection.

E. Hydro-test above ground piping @ 200 psi for two (2) hours.

F. Inspection of hangers, bracing, and seismic joint crossing(s).

G. Flow alarm test, tamper switch test.

H. Fire pump test.

I. Certification by installer (Title 24, Part 9, Article 1006.3.4.2).

J. Final inspection: signs in place, labeling, fire extinguishing system flow alarm test.

3.03 FIRE ALARM SYSTEM (Title 24; Part 9, Article 1006)

Note: Fire Sprinkler and Fire Alarm systems tests shall be performed in presence of State Fire Marshal.

A. Approved drawings shall be on jobsite from start to completion of project.

B. Verify Emergency Power source.

C. Activate all initiating devices.

D. Certification by installer (Title 24, Part 9, Article 1006.3.4.2).

E. Complete test of system per Title 24, Part 9, CFC, Article 1003.3.4.1).

3.04 MEANS OF EGRESS (Title 24, Part 2, Volume 1, Chapters 10)

A. Exit sign/light locations and connected to two (2) sources of power.

B. Normal Power.

C. Emergency Electrical System, Life Safety Branch.

D. Construction - floors, walls, ceilings, penetrations per listings.

E. Electrical boxes - no back to back, 24 inches horizontal separation (Section 709).

F. Electrical boxes - 100+ square inches to be wrapped/protected.

G. Flame Spread, Fuel Contribution and Smoke Density for finishes (Chapter 8).

3.05 EMERGENCY LIGHTING

A. Generator Test (Title 24, Part 3, Section 700-4; Section 701-5).

B. Emergency lights - locations (Title 24, Part 2, Volume 1, Chapter 10, Section 1003.2.8.5).

3.06 KITCHEN HOOD FIRE SUPPRESSION SYSTEM (Title 24, Part 9, Article 10, Section 1005; Part 9, Section 10.513)

A. Approved drawings shall be on jobsite from start to completion of project.

B. State Fire Marshal to witness system test.

3.07 MECHANICAL CHECKLIST FOR CLOSE-OUT (Title 24, Part 4)

A. Mechanical Equipment Requirements

1. Access to Equipment (Section 305, 405, 606.5, 815, 2.2.8, 903, 910.8, 1106.3).

2. Labeling of Equipment (Section 307).

3. Identification of Equipment - Area or Space Served (Section 304.5).

B. Mechanical Testing

1. Air balance completed and reviewed by Mechanical Engineer-of-Record.

2. Hospitals (Chapter 3, Section 314.1, Table 2110-A).

3. Skilled Nursing (Chapter 3, Section 314.2) [test to include humidity controls in required areas - Section 2102(a)].

4. Hydronic balance completed and reviewed by Mechanical Engineer-of-Record.

5. Air and Hydronic reports forwarded to Mechanical Engineer of Record.

6. Fuel Gas line inspection (Part 4, Section 1406 and Appendix B, Chapter 16).

7. Atrium and/or Building Smoke Evacuation System (State Fire Marshal to witness).

C. Boilers

1. Boiler – Operating Adjustments and Instructions (Section 1022).

2. Boiler – Inspections and Tests (Section 1023).

3. Boiler – Clearances/Permits (Section 1005.0).

D. Ducts

1. Installation - Bracing (Part 4, Section 604.1.4)

2. Fire Damper test log from IOR (Part 4, Section 606.2).

3. Fire Damper test by State Fire Marshal (Part 4, Chapter 6, Section 606.2).

4. Smoke Damper and Detector test log from IOR (Including Duct Detector tests).

5. Smoke Damper and Detector by State Fire Marshal.

E. HVAC Unit Testing

1. Verify correct filter types and efficiencies.

2. Motor Rotation.

3. Condensate drain tests (Section 310).

4. Equipment shut down by smoke detectors (duct or space).

3.08 PLUMBING CHECKLIST FOR CLOSE-OUT (Title 24; Part 2, Chapter 29; Part 5)

A. Piping Systems (Title 24, Part 5)

1. Domestic Water Line Sterilization Test (Title 24, Part 2, Section 609.9; Title 22, Division 4, Chapter 16, Article 5).

2. Domestic Water System (hot, cold) Pressure test (Title 24, Part 5, 609.4).

3. Natural Gas Pressure Test (Title 24, part 5, Chapter 12, Section 1204).

4. Vent & Waste System Pressure test (Title 24, Part 5, 712.0).

5. Hydronic Water Pressure test (Title 24, Part 4 1201.2.8).

B. Water Heater Testing

1. Water Heater Temperature Test (Domestic/Patient) (105-120°F).

2. Water Heater Temperature Test (Kitchen) (180°F).

3. Water Heater Temperature Test (Laundry) (169°F).

4. Water Heater Temperature Alarm Test (Patient) (125°F).

C. Medical Gas System Testing (NFPA 99, Chapter 4) (Witnessed by SFM).

1. Pressure test - 150 psig - Oxygen, Medical Air & Nitrous Oxide (4-3.4.1.2).

2. Pressure test - 200 psig - Nitrogen (4-5.1.3.4).

3. 24-hour pressure test - 60 psig - Vacuum system (4-10).

4. 24-hour pressure test - 20% over operating pressure [A-4.3.4.1.2 (b)(e)].

5. Alarm test for system [4-3.4.1.3 (d)].

6. Area Valves, location, labeled, alarms tested (4-4.1 & 4-5.1.4).

7. Laboratory testing affidavits - welding/brazing (4-6.2.3.3).

8. Verified Medical Air Quality - Installation and 24 hour later.

9. Certification of system (Purity, Cross Connection, Alarms, Etc.) [4.5].

10. Certification of Bulk System [NFPA 50 (Oxygen) & CGA G-8.1 (Nitrous Oxide)].

11. Approved drawings and documents for submittal to University's Representative for permanent records).

3.09 ELECTRICAL CHECKLIST FOR CLOSE-OUT (Title 24, Part 3, and Part 1, Chapter 7, Section 7- 141, 7-149)

A. Main Panel/Service

1. Identification and Labeling of Equipment (110-21, 110-22, 230-70).

2. Grounding test and Certification (250, 250-56).

3. Ground fault interrupt test adjustment and certification [230-95(c); 517-17(c)].

4. Emergency power transfer switch test (700-4).

5. Panel load balance.

B. Emergency Power and Standby Systems (Article 700 & 701) [Test Logs from IOR]

1. Emergency Generator testing and certification (701-5).

2. Identification and Labeling of equipment (110-21, 110-22, 517-22).

3. Lighting and Lighting Levels (517-22).

4. Receptacles (410L, 517-13, 517-18, 517-19).

5. Exiting signs and lights [517-32(b), 517-42(b)].

6. Nurse and Staff Call [517-33(a)].

7. Fire Alarm (760).

C. General Electrical Requirements

1. Working space/Headroom [Table 110-26(a); 110-33; 110-34].

2. Circuits and lights tested (410-45).

3. Receptacle polarity and grounding [200-10(b)].

4. Isolated ground monitor test [517-160(b)].

5. Motor load current adjustment.

6. Identification and Labeling of equipment (110-21; 110-22).

7. Identify circuits (Critical Care Areas) (517-19).

D. Miscellaneous Electrical Requirements

1. Test logs from Contractor and Inspector-of- Record.
2. Electrical Engineer-of-Record acceptance of system.
3. Owner In-Service training on Equipment.
4. Equipment Manuals and Instruction to Owner.
5. Warrantees and Equipment Certification.
6. As-Built documents to Owner.

3.10 FIRE MARSHAL INSPECTION REQUIREMENTS

A. Framing Inspections

1. Structural members in fire-resistive construction.
2. Check fireproofing per approved design tested assembly description.

B. Fire-Rated Partition Locations

1. Check for stud and nailing/screwing spacing per approved design tested assembly description.
2. Check for fire blocking in combustible construction.
3. Check for rated door/window frame installation (manufacturer's installation instructions shall be available for review).
4. Check for electrical installation, for example, number and size of electrical boxes, panels, cabinets, etc.
5. Check hangers, seismic bracing for sprinkler piping installation, if applicable (this would be checked during overload pressure test inspection phase of sprinkler system).

C. Close-In Inspections

1. Check fire-blocking and draft stops in combustible construction.
2. Check gypsum board installation in accordance with approved design assembly description for rated assembly.
3. Check integrity of firewall construction where recessed cabinets, panels, excessive electrical/plumbing are installed.

4. Check fire damper installation (manufacturer's installation instructions shall be available for review). Fire Marshal will witness actuation of minimum 10% fire dampers installed and 100% in 2 hour or greater fire rated wall assemblies.

5. Check for through-penetrations and fire-stop systems in all walls or floor/ceiling assemblies.

    a. Check top of wall to structure fire stopping.

6. Check above ceiling areas and construction prior to installation of ceilings.

    b. Check access and serviceability for above ceiling to include but not limited to valves, mechanical equipment, electrical equipment and other components that require adjustment, access or service.

    c. [Contractor] [CM/ Contractor] [Design Builder] shall move any items including but not limited to conduit, piping, braces and other obstructions that block access to equipment and components needing adjustment, access or service.

    d. Check bracing, anchorage, fasteners and installation.

D. Final Construction Inspections

1. Final project walk-through: Example, Emergency lighting will be tested to verify exit illumination of both interior and exterior, while generator (if applicable) is tested at same time.

3.11 HCAI – Testing, Inspection and Observation

3.12 Refer to the following attachment

A. Inspection Request

B. Non-conforming Work Notice

END OF SECTION 01 45 50

INSPECTION REQUEST

Project #: _____ HCAI #: _____ UCDH IR #: _____ [Contractor][CM/Contractor][Design-Builder] IR #: _____ Date: _____

Project Spec Section

Name: _____ (s): _____

To: UC Davis Health	From:
Facilities Design & Construction – Inspection Trailer	
4430 V Street, Building 35	
Sacramento, CA 95817	
P: 916-734-5060	P:
Email: lfuka@ucdavis.edu & Project IOR	E-mail:

Drawing Ref.: _____ Detail: _____ Shop Drawing: _____

Project Schedule Activity ID No.: _____ Date of Inspection: _____ Time Requested: _____

Type of Inspection: _____

Location of Inspection (i.e., Floor, Column Line, etc.): _____

*Re-inspection Requested for Previous UCDH IR #: _____

All work Requested for Inspection has been reviewed for compliance with the contract documents by [Contractor][CM/Contractor][Design-Builder]'s Superintendent prior to notification of Inspection Request.

Signed: _____ Date: _____

UNIVERSITY USE ONLY

Date Received: _____ Time of Inspection: _____

Date of Inspection: _____ Inspector: _____ ☐ Inspection Report Attached

Inspector Arrival Time: _____ Inspector Departure Time: _____

Comments: _____

☐Approved ☐Approved as Noted ☐Not Approved ☐ Cancelled

Inspection Request Notes or Description of Items of Deficiency if needed below (Part 1, Chapter 7, Section 7-145, item 6)

Project Field Record of Construction Progress Summary of Work in Progress (Part 1, Chapter 7, Section 7-145, item 6)
Project Phase (Building Foundation, Structural, Wall Framing, Electrical Rough-In, Sprinkler Rough-In, etc.)
Project Phase Percentage Complete (% of the phase completed): Overall Project Percentage Complete:

NON-CONFORMING WORK NOTICE

PROJECT #: _____ **HCAI #:** _____ **Notice #:** _____ **Date:** _____

To: Atosa Abedini; aabedini@ucdavis.edu Ken Yamauchi; kyamauchi@hy-arch.com	**From: UC Davis Health IOR** **Facilities Design & Construction – Inspection Trailer** **4430 V Street, Building 35-A** **Sacramento, CA 95817** **P: 916-734-5060**

Spec Section Ref.: _____ **Paragraph:** _____ **Drawing Ref.:** _____

Detail: _____

In accordance with Article 12 of the General Conditions, the following defective condition(s)has/have become apparent:

Reported by: _____

CORRECTIVE ACTION SHOULD BE TAKEN AS SOON AS POSSIBLE AND COMMENCE NO LATER THAN TEN (10) CALENDAR DAYS AFTER THIS NOTICE. COORDINATE THE VERIFICATION OF THE CORRECTIVE ACTIONS WITH THE INSPECTOR OF RECORD. IF FURTHER INFORMATION IS NEEDED, ADVICE UNIVERSITY'S REPRESENTATIVE IN ACCORDANCE WITH THE GENERAL CONDITIONS.

Description of corrective action taken: _____

Accepted by: _____ **Date:** _____

CC:

SECTION 01 52 00

CONSTRUCTION FACILITIES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Field Offices and Sheds

B. Temporary Facilities

C. Temporary Sanitary Facilities

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013500 – SPECIAL PROCEDURES: General requirements for temporary facilities and temporary controls to accommodate University continued occupancy and use of the areas and spaces adjacent to construction.

C. Section 017400 – CLEANING

D. Section 017700 – CLOSEOUT PROCEDURES

1.03 FIELD OFFICES AND SHEDS – **NOT USED**

1.04 TEMPORARY FACILITIES

A. **Contractor** shall provide and maintain the following temporary facilities as required for execution of the Work:

1. Scaffolding, staging, runways and similar equipment.

2. Hoists or construction elevators, complete with operators, power and signals required.

3. Temporary rigging, rubbish chutes, barricades around openings, ladders between floors, and similar equipment.

4. Barricades, fencing, lights and similar safety precautions.

5. Security cameras for remote video surveillance of the project site and 24/7 monitoring services that records and reports incidents and alarms. Security cameras to provide full coverage of the construction and storage site area.

B. Maintenance: Use all means necessary to maintain temporary construction facilities and controls in proper and safe condition throughout progress of the Work.

C. Replacement: In event of loss or damage, promptly restore temporary construction facilities and controls by repair or replacement at no change to the Contract Sum or the Contract Time.

D. Conformance: All materials and equipment required to safely accomplish work under this Section shall be in conformance with requirements of CAL OSHA and other State and Federal Codes and regulations where applicable.

E. Codes: All temporary work and facilities shall conform to the above requirements that pertain to operation, safety and fire hazard.

F. Construction Site Security: Temporary barriers, doors and gates shall be keyed to University's master lock system. Security hardware to be provided by **Contractor**. Keying to University master lock system will be provided by University.

1.05 TEMPORARY SANITARY FACILITIES

A. Use of existing facilities: Designated toilet facilities may be used by **Contractor**.

1. Assigned facilities: Location of assigned toilet facilities and maintenance of same are responsibility of University. **Contractor** shall not have exclusive use to these facilities and shall abide by health and safety criteria regarding their use and sanitary upkeep.

2. Unassigned facilities: Unassigned toilet facilities shall not be used without written authorization of University's Representative.

3. **Contractor** may use existing toilet facilities that are within the limits of the Work.

B. **Contractor** shall pay service charges for connection and use of sewage utilities.

C. Portable units: Enclosed, portable, self-contained units or temporary water closets and urinals, secluded from public view may be used. Self-contained units shall be approved by University's Representative prior to use.

1. **Contractor** shall pay costs of installation, maintenance and removal of temporary sanitary facilities.

2. Provide facilities at time of site mobilization.

3. Modify and extend services as work progress requires.

4. When utility services are available, provide water, sewer service, and temporary water closets; remove portable facilities. Remove temporary fixtures when permanent facilities are operational.

5. Clean areas of facilities daily, maintain in sanitary condition. Disinfect fixtures, repair or replace damaged fixtures, accessories and surfaces.

6. Provide toilet paper, paper towels, and soap in suitable dispensers.

7. Restore existing and permanent areas and facilities used to original condition. Remove all temporary construction facilities above and below grade. Leave the project site clean and free of debris, materials and equipment.

PART II - PRODUCTS

2.01 MATERIALS

A. Serviceable, new or used, adequate for required purpose.

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 52 00

SECTION 01 55 00

VEHICULAR ACCESS AND PARKING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Construction Parking and Access Roads

B. Traffic Regulation

C. Project Informational Signs

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

C. Section 013500 – SPECIAL PROCEDURES: General requirements for temporary facilities and temporary controls to accommodate University's continued occupancy and use of the areas and spaces adjacent to construction.

D. Section 017400 – CLEANING

E. Section 017700 – CLOSEOUT PROCEDURES: Project Closeout.

1.03 PARKING AREAS AND ACCESS ROADS

A. Access Roads: Existing roads shall be used for construction access within limits defined herein. Temporary construction access roads shall not be permitted.

B. Parking: Parking is controlled and limited by University.

1. Parking of personal vehicles belonging to **Contractor** employees may be arranged with University's Parking Services, at 916-734-2687. Parking will be allowed in employee permit areas, at the current permit rates depending on space availability.

2. Delivery of materials may be made to the job-site as required. **Contractor** shall coordinate with University's Representative.

3. Dumpsters shall be located in approved location as arranged by University's Representative.

C. Existing Pavements and Parking Areas: Designated existing on-site streets and driveways may be used for construction traffic. Vehicles with metal tracks will not be allowed.

1. Designated areas of existing parking facilities may be used by construction personnel. Do not allow heavy vehicles or construction equipment in parking areas.

2. Maintain traffic and parking areas in a sound condition, free of excavating material, construction equipment, products, mud, snow and ice.

3. Maintain existing and permanent paved areas used for construction. Repair existing facilities damaged by usage to original condition: promptly repair breaks, potholes, low areas, standing water and other deficiencies, to maintain paving and drainage in original or specified condition.

4. Remove temporary materials and construction when permanent paving is usable.

1.04 TRAFFIC REGULATION

A. Schedule of Access Closing: **Contractor** shall adopt all practical means to minimize interference to traffic. Access to other facilities in the area shall be maintained at all times. **Contractor** shall provide schedule of planned closing of any street for approval by University and shall give minimum of fourteen (14) calendar days' notice before closing any street or access.

B. Use of Fire Lanes: **Contractor** shall notify University of all major pickups and deliveries that require use of controlled access fire lanes. Keys to gates or other barriers will be provided, as needed, to allow use of fire lanes. Vehicles parked in fire lanes for delivery of materials shall be continuously manned for immediate removal if required by the University.

1. Fire Lanes to remain open at all times and shall not be blocked without a Traffic Control Plan provided prior to work at the Fire Lane and approved by the University's Representative.

C. All major pick-up and delivery operations shall occur in total before or after normal working hours.

1. Drawings may indicate haul routes designated by University for use of construction traffic. Confine construction traffic to haul routes.

2. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

D. Post-mounted and wall-mounted traffic control and informational signs as specified herein.

1. Traffic Control Signs, Traffic Message Boards, Cones, Drums, Flares, Lights and Flag Control equipment: All as approved by California MUTCD requirements.

2. **Contractor** shall furnish at all barricades: Lights and flag control required to control traffic, and shall also provide and maintain suitable temporary barricades, fences, directional signs, or other structures as required for protection of the public; and maintain from the beginning of twilight throughout the whole of every night on or near the obstructions, sufficient lights and barricades to protect the public and/or the Work.

E. Construction Vehicle Parking: Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and University's operations. Prevent parking on or adjacent to roads or in non-designated areas.

F. Flag Control: Provide properly trained and equipped flagmen to regulate vehicular traffic when construction operations or traffic encroach on public traffic ways.

1. Provide properly trained and equipped personnel to regulate pedestrian traffic at all interior locations where construction traffic interfaces with University traffic.

2. Flag control personnel shall wear appropriate identifying clothing such as bright colored vests, clearly visible and identifiable as having responsibility for traffic control.

G. Lights: Use lights during hours of low visibility to delineate traffic lanes and to guide traffic.

H. Traffic Signs and Signals: At approaches to site and on site, install traffic signs and signals at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

1. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under **Contractor**'s control, and areas affected by **Contractor**'s operations.

2. Relocate traffic signs and signals as Work progresses, to maintain effective traffic control.

3. Remove equipment and devices when no longer required. Repair damage caused by installation.

1.05 PROJECT INFORMATIONAL SIGNS – **NOT USED**

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION – Not Applicable to this Section

END OF SECTION 01 55 00

SECTION 01 56 00

TEMPORARY BARRIERS, ENCLOSURES and CONTROLS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Barriers and Enclosures

B. Protected Walkways and Weather Closures

C. Tree and Plant Protection

D. Temporary Controls

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013500 – SPECIAL PROCEDURES

C. Section 013900 - GREEN BUILDING POLICY IMPLEMENTATION

D. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

E. Section 017400 – CLEANING

1.03 BARRIERS AND ENCLOSURES

A. Barricades: Provide to prevent public entry, to protect existing trees and plants, and to protect existing facilities and adjacent properties from damage during construction period. Relocate and extend as construction progress requires per California MUTCD requirements.

B. Partitions and Ceiling Enclosures:

1. Fire Enclosures-Rated-Corridors and Rated Assemblies: Provide non-combustible dust-proof barrier framed with 20-gauge metal studs spaced 24" o/c maximum and covered on both sides with ⅝" thick Type-X rated gypsum wallboard fire taped, braced so to be self-supporting without fastening to existing finishes.

a. Provide gaskets of closed cell neoprene, or strips of fiberglass insulation between barriers and existing finish.

b. Finish exposed surfaces with two (2) coats of paint (color as selected by University), maintain in neat, orderly appearance and paint barrier on public side. Temporary emergency exit and or directional signage indicating Emergency Exits will be furnished and installed by **Contractor**.

c. Provide temporary doors in corridors with twenty (20) minute fire-rated assemblies and locksets to limit use.

d. Use of access doors and routes by workmen to be approved by University's Representative.

2. Fire Retardant Enclosures - Non-Rated Assemblies: Provide non-combustible dust-proof barriers framed with metal studs and covered on public side with Fire Retardant plastic laminate sheathing material. Flame spread 10 - smoke development 45 - fuel contribution undeterminable, as manufactured by Reef Industries, Inc., P.O. Box 33248, Houston, TX77033 or equal.

a. Joints shall be taped and sealed over framing studs.

b. Bracing shall be self-supporting without fastening to existing finishes.

c. Provide gaskets of closed cell neoprene, or strips of fiberglass insulation between barriers and existing finishes.

d. Provide non-staining taped seal to surrounding materials to insure seal.

e. Non-Rated Assemblies for Dust Control: Use ½" Type-X or equal gypsum wallboard applied on occupancy side on framing member. Joints over studs shall be taped and sealed. Other detail similar to 1.03-B.2 above.

C. Removal: Remove temporary materials, equipment and construction at completion; repair damage caused by installation or use of barricades and enclosures. Restore existing facilities used during construction to specified or to original condition.

1.04 DIESEL VEHICLE/EQUIPMENT IDLING PROCEDURES

A. When drivers of diesel powered on-road vehicles arrive at loading or unloading areas to drop-off or pick-up passengers, supplies, equipment, materials, etc., they shall turn off their vehicle’s engine as soon as possible but no later than five minutes after arrival.

B. Operators of off-road diesel-powered equipment shall turn off their engines when the equipment is not performing its primary function, but no later than five minutes after the equipment has come to a stop.

C. Idling for “warm-up” prior to diesel vehicle or equipment operations on University property shall be limited to a maximum of five minutes.

D. At end of work shift, or for the purpose of servicing, all diesel equipment shall be parked on site at furthest location away from Hospital air intake systems.

E. All diesel-powered equipment shall be maintained in good operating condition. University representative will direct **Contractor** to remove any equipment producing high amount of diesel fumes resulting from diesel equipment being old or in poor operating condition.

1.05 PROTECTED WALKWAYS AND WEATHER CLOSURES

A. Cover walkways to provide access to existing facilities for use by public and University personnel.

B. Provide temporary roofing and weather-tight insulated closures of openings in exterior wall surfaces, to maintain specified working conditions, to protect products and finished work from inclement weather.

C. Critical access and protected walkways shall comply with the CBC and CFC.

1.06 TREE AND PLANT PROTECTION

A. Tree Protection: All trees not marked for removal shall be protected against damage from construction operations. Where necessary, in the opinion of University's Representative, trees surrounding building footprint or in close proximity to construction operation shall be protected with barricades. No trees shall be cut or felled without approval of University's Representative. Trees cut and/or removed without explicit instruction shall be replaced by **Contractor** at no cost to the University.

B. Cutting and Pruning: Cutting and pruning of trees to accommodate construction shall be done only with approval and direction by University's Representative. Soil within the spread of tree branches (within drip line) shall not be disturbed except as directed by excavation or trenching drawings. Advance notice shall be given University if tree roots of 3" diameter or greater must be cut.

C. Drip line Protection: Cars, trucks, or equipment shall NOT be parked or set within the drip line of any tree; nor shall there be any stockpiling or temporary building erected within the drip line.

1.07 TEMPORARY CONTROLS

A. Dust Control: **Contractor** shall take appropriate steps throughout project to prohibit airborne dust due to work under this contract. Execute work by methods to minimize raising dust from construction operations. Water shall be applied wherever practical to settle and hold dust to minimum, particularly during demolition and moving of materials. No chemical dust prohibitor shall be used without written approval by University's Representative.

B. Noise Control: Control noise as directed by University's Representative.

C. Pollution Control: Use of noxious or toxic materials for all applications in alterations or work in buildings occupied by University personnel shall be done after proper notification and approval by University, this includes work performed on weekends or other unoccupied times.

1. Provide methods, means and facilities to prevent contamination of soil, water and atmosphere from discharge of noxious, toxic substances and pollutants produced by construction operations.

D. Waste Control: All waste materials resulting from process of clearing and construction shall be disposed of as follows:

1. General Refuse: All refuse and debris, combustible and incombustible, resulting from construction process, shall be removed from University property as described in the General Conditions of the Contract. **Contractor** shall not use any refuse container belonging to University.

2. Hazardous Refuse: Solvents, oils and any other hazardous material shall be disposed of in containers and removed from site. At completion of work, any contaminated soil shall be removed and replaced with good soil by **Contractor** at no expense to University. Coordinate disposal with UC Davis Health EH&S department.

3. Building materials containing asbestos that are part of the project shall not be disturbed or removed by the contractor during the construction of temporary barriers, enclosures and controls. The contractor shall request from the University's Representative materials that have been identified on the project to contain asbestos so that these materials are not disturbed. The contractor shall refer to Section 013500 Special Procedures, 1.05 Hazardous Materials Procedures regarding materials impacted by construction of temporary barriers, enclosures and controls.

4. All material and equipment removed as part of the Project is property of University, unless specifically designated otherwise; such material and equipment shall be delivered to a location at the campus, as directed by University, to be selectively sorted by the University; remaining debris shall be disposed of by **Contractor** at no expense to University.

E. Drainage Control: All portions of Work shall be kept free of standing water at all times during construction. Where required, temporary drainage ditches, berms, or pumping systems shall be constructed to divert drainage water from construction site, and resultant water shall be carried to nearest natural water course and disposed of without erosion to surrounding area. Care shall be taken to prevent silting of existing sinkholes and watercourses. Silt deposited as a result of the Work shall be removed and disposed of by **Contractor** at no cost to the University.

1. Rough grade site to prevent standing water and to direct surface drainage away from excavations, trenches, adjoining properties and public rights-of-way/s.

2. Maintain excavations and trenches free of water. Provide and operate pumping equipment of a capacity to control water flow.

3. Provide de-watering system and pumping to maintain excavations dry and free of water inflow on a twenty-four (24) hour basis.

4. Provide piping to handle pumping outflow to discharge in manner to avoid erosion or deposit of silt. Provide settling basins to avoid silting; install erosion control at out-falls of system.

5. Winterize and stabilize site with Geotextile Fabric and gravel so that the site drains and avoids it becoming a quagmire. Maintain access roads on the site with Geotextile Fabric and gravel and make repairs to avoid furrow, ruts, or potholes.

6. Remove equipment and installation when no longer needed.

F. Sediment and Erosion Control: **Contractor** shall furnish, install and maintain means and methods to reduce excessive erosion, minimize sedimentation discharge, and prevent construction materials discharge from causing off-site and on-site contamination. **Contractor** shall coordinate with University.

1. **Contractor** shall pay for and maintain required permits.

2. **Contractor** shall furnish:

a. National Pollutant Discharge Elimination (NPDE) permit.

b. **Contractor** shall file Notice of Intent to California State Water Resources Control Board (SWRCB) stating date construction will begin. Provide copy to University.

c. **Contractor** shall prepare, maintain and follow Storm Water prevention Plan. The Plan shall include **Contractor**'s Best Management Practices (BMP) describing means and methods to control sediment, erosion and other pollutants.

d. **Contractor** shall keep BMP Program at jobsite.

PART II - PRODUCTS

2.01 Polyethylene: Polyethylene used for critical barriers and for sealing walls, floors or ceiling systems shall be a minimum of 6 mil thickness and fire-retardant type listed by Fire Underwriters Laboratories, Griffolyn #T55R with Griffolyn fire retardant tape, or equal.

PART III - EXECUTION - Not Applicable to this Section

END OF SECTION 01 56 00

UC DAVIS HEALTH CONSTRUCTION DUST & HAZARDOUS MATERIALS INSPECTION WORKSHEET – APPENDIX A

ICRA Permit Number	ICRA Class
Job # and Name	Project Manager
Estimated Start	Estimated Completion

ACKNOWLEDGEMENT OF HAZARDOUS MATERIALS

Does the project contact hazardous materials (e.g., asbestos, lead, mold, PCBs, mercury)?	Yes / No
Verified How: (e.g., hazmat survey, personal knowledge)	
By Whom: (name & department)	

CONTAINMENT STRATEGIES

Enclosure Types [check all that apply]					
	Full Containment (poly over all surfaces not in SOW) ☐ Hard Barriers Required				
	Isolated Room – Critical Openings Only (seal doors, supply and return registers, etc)				
	Mini Containment Cube (only large enough for 1-2 people; aka pop up cube)				
	Shrouded Tool with HEPA filtered exhaust				
	Glove Box Containment with HEPA filtered exhaust				
	Other:				
Negative Pressure Requirements [check all that apply]					
	-0.020” wc at all times (24/7) as displayed on mounted manometer				
	-0.020” wc at setup with some negative pressure throughout project as displayed on manometer				
	Visual Verification of some negative room pressure throughout project				
	No negative room pressure required				
	Negative pressure in localized HEPA exhausted work area (e.g. shrouded tool, glove box)				
	Other:				
Negative Pressure Equipment [check all that apply]					
	Onsite Challenge Testing (DOP or particle counting) prior to setup				
	Challenge Tested within last 6 months; Equipment has remained onsite at University				
	Single HEPA Unit; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Two HEPA Units in Parallel; exhausted to: ☐Outdoors ☐ Diffusion Box/Chamber				
	Other:				
Additional Containment Requirements [check all that apply]					
	Ante Room		Masonite Floor Protection		Protective Clothing
	Walk off mats		Shoe Covers		Air Scrubber
	Other:				

VERIFICATION OF WORK

Type(s) of Inspection Required		Responsible Party
	HEPA Equipment Verification	□ EH&S □ Consultant □ Other:
	Pre-Work Approval Inspection	□ EH&S □ Consultant □ Other:
	Daily Onsite Oversight	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Air Sampling Type:_____ Frequency:_____	□ EH&S □ Consultant □ Other:
	Demolition Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:
	ICRA Downgrade	□ PM □ EH&S □ Consultant □ IOR □ Other:
	Final Visual Approval Inspection	□ PM □ EH&S □ Consultant □ IOR □ Other:

INITIAL INFORMATION AND BENCHMARK CONTAINMENT INSPECTIONS – APPENDIX B

ICRA #	Location	Set Up Date	Electrical Shop Inspection	Pre-Start Inspection (Name, Date, Time)	Post-Demo Inspection (Name, Date, Time)	Downgrade Inspection (Name, Date, Time)	Final Inspection (Name, Date, Time)	Take Down Date

DAILY INSPECTION LOG

(Sheet _____ of _____)

Date & Time	Performed By(Name)	Pressure Reading (+/-)	Acceptable Negative Pressure? (Y/N)	ILSM conditions still met? (Y/N/*n/a*)	Tack Mat useable? (Y/N)	Interior free of dust/debris? (Y/N)	Containment Integrity Intact (no holes or breaches)? (Y/N)	All ICRA permit conditions met? (Y/N)	Other Issues? (Explain)	Corrective Actions
Example 7/4/16 – 0800	B. Clean	-0.025	Y	Y	Y	Y	Y	Y	N	closed entry door

ENTRY WARNING SIGN WITH PROJECT MANAGER CONTACT INFORMATION – APPENDIX C

CAUTION

CONSTRUCTION DUST PRECAUTIONS IN USE
DO NOT ENTER

For More Information Contact the Project Manager

_____

(Name)

_____

Phone Number

(THIS SIGN MUST BE POSTED IN COLOR)

SECTION 01 56 10

AIRBORNE CONTAMINANTS CONTROL

PART I - GENERAL

1.01 SUMMARY

A. Section Includes: University airborne contaminants control policy procedures and an Infection Control Risk Assessment (ICRA) and plan.

1.02 POLICY

A. Airborne contaminants control is critical in all hospital areas, as well as non-hospital areas. **Contractor** shall limit dissemination of airborne contaminants produced by construction-related activities, including dust, chalk, powders, aerosols, fumes, fibers and other similar materials, in order to provide protection of immuno-compromised and other patients, staff, diagnostic operations, or sensitive procedures or equipment, from possible undesirable effects of exposure to such contaminants.

1. Construction activities causing disturbance of existing dust, or creating new dust, or other airborne contaminants, must be conducted in tight enclosures cutting off any flow of particles into patient areas.

2. Ceilings, walls in Protection Areas and other areas in patient care areas as indicated on drawings must be secure at all times.

B. An Infection Control Risk Assessment (ICRA) and plan to mitigate dust or other airborne contaminants is required for each project. The risk assessment identifies patient groups at risk for infection due to construction dust. The dust mitigation plan is designed to contain dust within the construction zone.

C. All work at hospital facilities shall follow the recommended UC Davis Medical Center Construction Dust Infection Prevention Best Practices Standard, Version 4.0 – December 2022 or the most recent version.

D. Should the scope of work change or the discovery of additional toxic materials such as asbestos, lead and radioactive materials or biological substances such as visible mold growth, STOP WORK and seek additional approval and guidance before proceeding. If the above potential materials newly discovered during construction, renovation, or repairs, any ICRA in-hand is invalid and risk assessment shall be performed to reevaluate ICRA levels and the work plan prior to restart of the work. Upon discovering, seal any openings, stop work and notify the University's Representative immediately. This includes projects that are already considered and operating under a Class IV.

E. Related Sections:

1. Section 017300 – CUTTING AND PATCHING: Removal of debris may be outside of normal work hours and shall be in tightly covered containers.

2. Section 013500 – SPECIAL PROCEDURES: Perform work in accordance with requirements of this section.

3. Section 013900 - GREEN BUILDING POLICY IMPLEMENTATION

4. Section 015100 – TEMPORARY UTILITIES: Provide high efficiency particulate air (HEPA) filters as specified in Section 015610, negative pressure ventilation, or special control of existing system as determined by University's Representative.

5. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS: Extend barriers above ceilings as required to seal off and contain airborne contaminants.

6. Section 015600 – TEMPORARY CONTROLS: Contain waste materials during removal; bagging, wrapping, and transporting.

7. Section 017400 – CLEANING: Use wet cleaning methods and HEPA filtered vacuum cleaners as required to minimize release of airborne contaminants. Contain waste materials, debris and rubbish as noted above and clean work area daily. Excess construction debris shall be cleaned daily by the end of each work shift. Disinfect Containment and Protection Areas as directed by University's Representative

F. Dust Mitigation Requirements

1. An ICRA Daily Inspection Log Compliance Survey is attached at the end of this section under UC Davis Health Construction Dust Infection Prevention Best Practice Standard. The **Contractor** must complete this daily checklist and leave posted for the duration of the project at the outside of the containment. Any areas of non-compliance must be specifically listed and addressed for corrective measures when identified. A copy of the daily ICRA inspections shall be submitted to the University's Representative at an agreed upon time between the **Contractor** and the Project Manager.

G. UC Davis Health Construction Dust Infection Prevention Best Practice Standard

a. The UC Davis Health Construction Dust Infection Prevention Best Practice Standard is attached at the end of this Section and augments information & requirements of Section 015610.

b. Refer to the UC Davis Health Construction Dust Infection Prevention Best Practice Standard per requirements for.

1) Responsibilities

2) Procedures

3) Training And Certifications

4) Containment Design & Construction

5) Materials And Equipment

6) Cleaning Procedures

7) Documentation

8) Containment Verification

9) Inspection Criteria

10) And other Dust Infection Prevention Measures

1.03 SUBMITTALS

A. Submit to Project Inspector or Post at Anteroom Daily ICRA Inspection Log.

B. Schedules: Submit work areas and procedure schedules for containment of airborne contaminants. Include this work in the Project Schedule per 013200.

C. Detailed Work Plan: Drawings including but not limited to Work Area/ Floor Plan, Path of Travel, Egress and Exiting, Rated Construction and details of construction of necessary temporary barriers, and description of procedures to be used to achieve and maintain control of construction-related airborne contaminants.

1. As applicable, the drawing should include the following: location of ante room(s), location of manometer, location of negative air units exhausting outside the construction area including number of negative air units and sizes (cfm), and location of sealed blocked off areas of corridors. If the exhaust of the negative air unit(s) cannot be exhausted outside of the building, the work plan shall include details, product documents and drawings of the approved fire-rated assemblies that will be used to meet Fire Codes (if applicable), Building Codes and ILSM requirements. Any impacts to corridors will need to be approved via ILSM (see specification section 013500 for details).

2. Identify the areas surrounding the project area, assessing potential impact of construction on the patient care area. Identify the specific uses (e.g., patient rooms, medication room, operating room, etc.)

3. Identify the potential impacts including but not limited to.

a. HVAC, Ventilation (outages, air flow directions, clean to dirty, air intakes/exhausts, air balance, disruptions, etc.).

b. Plumbing (outages, hand-washing access, work area, flushing/draining systems, charging systems, disinfecting systems, etc.).

c. Electricity (outages for critical equipment, special ventilation areas, monitoring).

d. Identify Airborne infection isolation rooms and patient rooms with immuno-compromised conditions that will require High-efficiency Particulate Air (HEPA) filters.

4. Identify containment measures including but not limited to types of barriers to be used. HEPA filtration to be used. Renovation/construction areas should be isolated from occupied areas during construction and provide clean-to-dirty airflow with respect to surrounding areas.

5. Assess preventive maintenance requirements. Will the service/maintenance frequency and level of service of systems need to be modified during construction (e.g., ventilation filters, air intake system, potable water, plumbing, doors). Work Hours: Can or will the work be done during non-patient care hours?

6. Include provisions for but not limited to traffic flow, entrance, egress, control, debris removal and housekeeping.

7. Work Hours: Identify areas of work that will be done during non-patient care hours. Refer to Sections 011100 Summary of Work and Section 011400 Work Restrictions

8. The Detailed Work Plan shall be reviewed and approved by the University's Representative prior to the start of Construction.

D. Project Experience and Training: In order to be considered qualified to work with negative pressure containments; **Contractor'**s must demonstrate experience by providing either of the following:

1. Previously completed, documented negative pressure containment work in a healthcare facility along with an owner reference. Minimum documentation shall include project descriptions and photographs or containment schematics.

2. Documentation that the contactors' proposed foreman has successfully obtained one of the following from the American Society for Healthcare Engineering (ASHE):

a. Certified Healthcare Constructor (CHC) Certification

b. Health Care Construction (HCC) Certificate

c. Managing Infection Prevention During the Construction & Operation of Health Care Facilities Course Completion

d. Completion of an ICRA training course approved by University

3. Documentation that all contractor employees and subcontractor's employees have successfully completed an ICRA training class that is approved by University. All personnel working with negative pressure containments shall be trained and knowledgeable in the following:

a. ICRA Permit contents and requirements

b. Site specific containment plan requirements that follow best management practices

c. Infection risks associated with construction

d. Methods to control the dissemination of dust and fungal spores

e. Proper use of protective clothing

f. Proper entry and exit procedures

g. Manufacturer's requirements, where manufactured containment systems are used (e.g., portable pop-up cubes)

h. How to respond to a loss of negative pressure or too much negative pressure

i. Breach in practice response and required notifications

4. Contractors shall be additionally trained in the following:

   a. Proper containment design, construction, and maintenance techniques

   b. Proper load out techniques for equipment/wastes

   c. Containment cleaning regime: daily, final, and terminal cleaning

5. Containment failure emergencies caused by the contractor may require retraining at the discretion of the University's Representative Infection Control, or Environmental Health & Safety. Training is to be provided by University Environmental Health & Safety or a University approved training consultant.

6.

1.04 QUALITY CONTROL

A. Pre-construction Meeting: Before any construction on site begins, **Contractor**'s Superintendent is required to attend a mandatory pre-construction orientation session held by University's Representative for a review on precautions to be taken as required in their ICRA work plan.

B. Review by PO&M HVAC staff for possibility to disconnect air supply and return into the project area

C. Review by University Plant Operation & Maintenance Electrical staff for required electrical needs.

D. Negative air machines shall be connected to separate electrical circuits.

E. Notification: A minimum of fourteen (14) calendar days written notification to University's Representative of possible construction activity causing airborne contaminants in Protection Areas.

1.05 DEFINITIONS

A. Containment Areas: As determined by University's Representative and if shown. Includes all areas of construction activities, adjacent staging and storage areas, and passage areas for workers, supplies and waste. The containment area includes ceiling spaces above and adjacent to construction activities.

B. Critical Openings – Include all potential paths for air and contaminants to move from the project area to outside of the project area and include: supply registers, return registers, exhaust registers, doors, windows, electrical outlets, gaps at ceilings and other openings within the area where contaminants can escape. Sealing the critical openings can be accomplished with fire-rated tape, fire-rated plastic, fire-rated hard barriers and a combination of these materials to seal airtight the critical opening.

C. HEPA System DOP Testing – An ANSI / ASTM recognized method to test the integrity of a High Efficiency Particulate filter which filters out 99.97% of particles 0.3 micrometers or larger. DOP testing is performed by specialty Contractor**'s**. The Health System requires that HEPA systems be tested to the ANSI / ASTM standard as delivered prior to their use onsite as further described in this Standard.

D. ICRA (ICRA) Infection Control Risk Assessment - An evaluation of patient risk based on a matrix of the patient population health in the work area and the invasiveness of the project. This assessment ultimately generates a permit (ICRA permit) issued by Infection Prevention requiring compliance with one of five precaution levels. The ICRA program is documented in Hospital P&P 2120. ICRAs apply to patient care areas and their adjoining contiguous areas. All ICRA evaluations are the sole responsibility of the Health System Infection Prevention Department based on an application by the Project Manager. ICRA Permits expire and can be extended subject to approval by the Infection Prevention Department.

1.06 PERFORMANCE REQUIREMENTS

A. University's Representative's Responsibilities:

1. Determination of the Containment and Protection Areas, as well as, the standard of limitations of the **Contractor**'s responsibilities, required for the project.

2. Statement of Requirements: Description in graphic and written form as required to communicate the above based on evaluation of the construction area and the impact of the project on patient care.

3. Coordinate any testing and monitoring as necessary with EH&S or a third party.

B. **Contractor** Responsibilities:

1. Provide specific means and methods of achieving and maintaining control of airborne contaminants during construction.

2. Implement all mitigation measures as listed in the UC Davis Health Construction Dust & Hazardous Materials Inspection Worksheet, which have been reviewed and approved by Infection Prevention and EH&S. The work shall be performed in accordance with the specific ICRA/Dust Mitigation Plan, Class IV and approved ICRA Permit.

3. **Contractor** shall ensure that all workers are trained and adhere to the mitigation requirements including provisions indicated per UC Davis Health Construction Dust Infection Prevention Best Practice Standard attached at the end of this Section.

4. The contractor shall ensure that all site workers, including subcontractors, are knowledgeable of the requirements of plans, specifications and approved ICRA permit precautions and the reasons for controlling construction dust.

5. The contractor is required to stop work at times of excessive noise/vibration, when containment is breached, when this standard is not being complied with and when directed by University Representatives.

6. **Contractor** shall notify University's Representative in writing, a minimum of fourteen (14) calendar days prior to starting construction activity, which might be expected to produce excess levels of airborne contaminants in containment area so that additional precautions may be taken.

7. If project construction activities will occur beyond the expiration date identified in the ICRA Permit, **Contractor** shall coordinate with University’s Representative to

request extension of the ICRA Permit utilizing the ICRA 2.0 Permit Form attached provided at the end of ~~in~~ this section.

PART II - PRODUCTS

2.01 MATERIALS

A. Polyethylene: Polyethylene used for critical barriers and for sealing walls, floors or ceiling systems shall be a minimum of 6 mil thickness and fire retardant type listed by Fire Underwriters Laboratories, Griffolyn #T55R with Griffolyn fire retardant tape, or equal.

B. Approved one-hour fire-rated temporary containment systems that meet ASTM E84, Class A requirements for smoke and fire for fire rated assemblies/enclosures.

C. Fire-rated tape for sealing critical barriers and attaching plastic to building components.

D. Approved fire damper systems used to control smoke/fire in a fire-rated containment assembly.

PART III - EXECUTION

3.01 PROJECT SPECIFIC REQUIREMENTS: The below criteria shall be applied on a case by case basis as outlined in the project specific requirements, ICRA Permit(s), and EH&S Worksheet(s)

A. ATTACH ICRA PERMITS, EH&S WORKSHEETS, OR ANY OTHER APPLICABLE DOCUMENTATION

B. THE BELOW LISTED CRITERIA ARE POSSIBLE STRATEGIES FOR CLASS 3 AND 4 CONTAINMENTS. NOT ALL OF THE STRAGEGIES WILL BE ALLOWED OR REQUIRED. THE ICRA PERMIT AND EH&S WORKSHEET DEFINE WHAT IS ALLOWABLE. THINK OF THE ICRA PERMIT AND EH&S WORKSHEET AS A MENU. THE BELOW IS A DETAILED DESCRIPTION OF EACH ITEM ON THAT MENU.

3.02 CONTAINMENT CRITERIA

A. The outside of the work containment shall have present: ICRA Permit, Interim Life Safety Measure (ILSM) Permit, Daily ICRA Inspection Forms, manometer, entry warning sign, Containment Entry Log (provided by the **Contractor**) that lists all persons who enter the containment regardless of affiliation, including all University employees, an emergency telephone number of person to call 24 hours a day in the event of a negative pressure alarm or other issue, and that an Environment of Care Incident Report under the category of “Construction Dust” must be filed by area nursing management in case of constant or annoying alarms.

B. The interior of the containment area shall be cleaned on a continual basis daily. Hard surface floors in work area, adjacent hallways and passage areas require vacuuming with HEPA-filtered vacuum cleaners and frequent wet-mopping during demolition and construction; protect adjacent carpeted areas with plastic and plywood and vacuum with HEPA-filtered vacuum cleaners. Only an EPA Listed Germicide approved by the UC Davis Health Infection Prevention shall be used on the project site.

C. Contractor shall inspect the containment daily prior to starting work and immediately repair any breaches, holes, or other issues.

D. For projects of extended length when work activity is not being performed, including on

weekend or holiday periods, and if the work area had a very thorough surface cleaning and received a passing visual inspection by a third-party environmental consultant, the daily inspections are not required. At a minimum, ICRA inspections shall be made weekly for containments on projects of extended non-work activity.

E. Regardless of containment strategies, execute work by methods to minimize raising dust from construction operations. Water may be used to assist in controlling airborne dust.

F. Full containment

1. All surfaces in the containment area except surface where work is to occur must be covered in plastic unless they are non-porous, smooth, and accessible for cleaning.

2. Sealing of Openings: Use fire rated tape or other impenetrable sealant to seal barrier wall seams, cracks around window and door frames, exhaust system ductwork, pipes, joints and ducts. Use of spray glue is not acceptable to be used inside of the building.

3. **Contractor** must block off existing ventilation supply registers, return registers and exhaust registers in the construction area as critical barriers. Materials used to block off these critical barriers in a temporary construction area not exceeding 30 days may be constructed of 6-mil fire-rated plastic. Materials used to block off these critical barriers in a construction area exceeding 30 days shall be constructed of an approved fire-resistive material other than 6 mil plastic.

4. All polyethylene (plastic) and other materials used for temporary enclosures shall be at least 6 mil thickness and fire-retardant type. Zip poles or other easily removable supports shall be used for projects extending beyond one work shift. Temporary walls with metal stud framing may be required for long term projects and must be approved by the Project Manager. All doors leading into the containment area shall utilize zippered doors for control of the air flow and closing the plastic doors. Flapped doorways consisting of overlapping plastic are not acceptable in the building.

5. Creation of the negative pressure enclosure includes the requirement to complete temporary barrier walls in the attic space from the top of the ceiling to the underside of the roof deck in the project area when the ceiling system is opened.

6. Creation of negative pressure enclosure includes sealing wall cavities that are opened to prevent air transmission between adjacent spaces and the attic space that has air pathway to the attic space.

7. For temporary construction projects that do not exceed 30 calendar days, temporary work area containments may be constructed of 6-mil fire-rated polyethylene. Approval for this shall be by the Fire Marshal.

8. For projects that exceed 30 calendar days, all barriers used to construct the temporary containment systems in the project area shall be hard barriers that meet the ASTM E84, Class A requirements for smoke and fire. This will include the use of a hard door integral to the temporary containment system to allow access and egress to and from the construction area.

9. Smoke detectors that are present inside of the construction work area can be temporarily covered during the work shift with a loose-fitting plastic “shower cap”

that is commonly used on projects to prevent smoke alarms from inadvertently being triggered from dust. If this temporary dust control measure is used, the plastic overs shall be removed at the end of each work shift.

G. Critical seal of areas

1. Use tape or other impenetrable sealant to seal barrier wall seams, cracks around window and door frames, exhaust system ductwork, pipes, joints and ducts. Use of spray glue is not acceptable to be used inside of the building.

H. Double Ante Rooms with Negative Air Unit Attached to One Ante Room

1. In some locations when the negative air exhaust cannot be directed outside the building, and while temporary barriers are being installed, use of two anterooms connected in series to the construction zone may be used temporarily until full negative pressure containment is achieved. The use of double anterooms is a temporary measure and shall not be considered a primary means of negative pressure for control of dust. It must receive approval by Infection Prevention or EH&S before it can be considered. The configuration includes two anterooms connected with the clean anteroom accessible from the corridor, room, or space to access the project area. The second anteroom is connected to the construction work area.

2. If approved, a HEPA filtered negative air unit shall be attached to the anteroom that is connected directly to the construction work area. This anteroom is considered the “dirty” anteroom because air is drawn into this room from the construction area. The first anteroom accessible from the corridor, room or space is considered a “clean” anteroom because air is unidirectional, moving into the second anteroom.

I. Cubes

1. Mini-containments (pop-up cubes) which are designed to have at most 1-2 people are means of control to access attic spaces, wall spaces and subfloor spaces usually at defined entry points such as access hatches or above a drop-in ceiling system. Cubes shall have a HEPA filtered negative air unit attached or integral to the cube to create a negative pressure work environment inside of the cube. Cubes are reviewed and approved by the University’s Representative on a case by case basis.

J. Glove Boxes

1. A glove box can be used for some work where a HEPA filtered vacuum is attached to the glove box when a small area of work is to be performed. A glove bag is attached to the box enclosure to allow the worker to make small openings by drilling or cutting within the negative pressure glove box. Glove boxes are reviewed and approved by the University’s Representative on a case by case basis.

K. Shrouded tools

1. Shrouded tools can be used for some work. A HEPA (DOP Tested) filtered vacuum is attached to the shroud. Shrouded tools are reviewed and approved by the University’s Representative on a case by case basis.

3.03 NEGATIVE AIR CRITERIA

A. HEPA filtered air shall not be discharged into existing HVAC supply ducts, return ducts, exhaust ducts or building plenum spaces unless there is a dedicated exhaust duct available in the construction project area and is approved for use by the University Plant Operations & Maintenance.

B. The University's Representative shall determine if there is available a dedicated exhaust duct within the project area that is not connected to other exhaust ducts for exhaust out the building. This option can be considered if there are no other ducts attached to the exhaust duct, since other systems attached to the main exhaust duct might be pressurized, changing designed exhaust volumes, or creating back flushing of air in other connected ducts. Use of this option shall be reviewed and approved by University Plant Operations & Maintenance.

C. When the air from the HEPA filtered negative air unit exhaust cannot be directed outside of the building due to no windows in the vicinity of the work or if impractical, all HEPA filtered negative air units shall be exhausted to a location agreeable to the PM. Each HEPA unit shall be plugged into a separate electrical circuit to provide temporary redundancy should one unit fail or due loss of electrical power. The PO&M Electrical shop shall inspect and test each circuit connected to the HEPA negative air unit prior to use.

D. If negative air exhaust is required to be exhausted through a fire-rated assembly, the air shall be directed through approved fire-rated temporary containment systems that meet ASTM E84, Class A requirements for smoke and fire.

E. When the air from the negative air units is exhausted inside of the building, the exhaust air from negative air unit shall be directed into a "diffusion cube" constructed of pleated filters to disperse the air in a manner that does not raise dust or blow air directly onto patients, staff or visitors. The **Contractor** shall consider and install charcoal filters in the negative air units to control smells/odors associated with the construction.

F. Negative air units shall be positioned as far from the entry ante room containment as possible for distribution of air flow throughout the project area. The number of negative air units shall be to provide sufficient negative pressure and for a minimum of at least four (4) air changes per hour of the volume of the entire work containment.

G. Dual HEPA Units operating in parallel may be required for redundancy in high-risk areas.

H. DOP testing of HEPA equipment

1. Negative air units and HEPA filtered vacuums are to be challenge tested onsite by the DOP test method by a third party prior to being placed in service, after a HEPA filter change, when dropped or damaged or moved from the project site. Only HEPA systems that pass the challenge DOP testing can be used on the project.

All HEPA equipment shall be tested per ANSI/ASME N510 Section 10 to ensure 99.97% efficiency at 0.3 micrometer mean aerodynamic diameter.

2. The entire piece of HEPA equipment shall be challenge tested, not just the filter media. The University's Consultant or EH&S shall witness the HEPA challenge testing procedure in entirety. Once the HEPA system passes the challenge testing and passes, the HEPA equipment may be used at the location tested for a period not to exceed one year. The testing label shall remain on the HEPA equipment and remain legible. Re-testing of the HEPA equipment is required annually, if the piece of equipment is transported out of the building to another building location on the campus, if dropped, or otherwise subjected to forces that might unseat the HEPA filter, damaged by water or laceration of the filter or if HEPA filter maintenance or adjustments are performed.

3. When utilizing HEPA Filtered Vacuums for glove boxes or shrouded tools these HEPA Vacuums must be DOP tested.

3.04 NEGATIVE AIR MONITORING CRITERIA

A. Fully Monitored Negative Air Maintaining -0.020" Water Column (in-WC)

1. Build containment with negative air machines capable of maintaining a pressure differential of -0.020 in-WC across all critical barriers

2. Demonstrate negative pressure is achieved continuously (24/7) by means of an electronic manometer sensitive to measure down to -0.020" wp. The manometer shall be capable of measuring the water pressure down to at least -0.001" in-WC.

3. An Omniguard IV recording manometer is recommended as the standard instrument for containment pressure monitoring, but other electronic manufactured models with similar sensitivities at low pressures and recording capabilities are acceptable.

4. Inclined manometers using a liquid water solution and non-digital air pressure gauges are not an acceptable manometer since they do not meet the sensitivity of measuring -0.001" WC.

5. Zero pressure or positive pressure is unacceptable and must be responded to immediately. Locate and repair holes or breaches in exterior containment system with tape. Secure zip poles if they have fallen. Close entry door by zipping lower or closing flaps and securing.

B. Hybrid Monitoring and Visual Verification

1. Build containment with negative air machines capable of maintaining a pressure differential of -0.020 in-WC across all critical barriers.

2. During the course of construction, the scope of work may dictate removal of work (e.g. Ceilings or drywall) that would make it difficult to maintain -0.02 in-WC of

negative pressure. During working hours Visual Verification of negative pressure may be used in lieu of the -0.02 in-WC requirement with electronic monitoring.

3. At the end of shift all openings must be sealed to bring the containment back to the -0.020 in-WC requirement.

3.05 ADDITIONAL CONTAINMENT CRITERIA

A. Ante Room

1. An ante room is a separate chamber attached to the containment area with zippered doors to allow entry and exit into the containment area. Entry into the containment area shall be only via the ante room. The ante room is commonly constructed of zip poles or equivalent, plastic and tape. The ante room is sized for each project to allow workers and equipment to be moved into and out of the containment area. A sticky mat is required in the ante room for workers and carts on wheels to use when existing the ante room from the containment area. The zippered doors are to remain closed or adjusted slightly open as necessary to allow negative pressure to be maintained at a minimum of -0.020 in-WC during work periods and during off hours.

2. The ante room shall have a sticky mat present which is intended to remove any debris from the bottom of work shoes before leaving the ante room into the public area. The sticky mat is not intended to clean debris from the bottom of disposable coveralls or from booties. The sticky mat layers shall be replaced many times during a work shift when work involves movement of many workers and supplies out of the containment area.

3. All people who enter and leave the project containment area including the contractor and all subcontractor employees are responsible for removing a dirty sticky mat and replacing it with a clean one when it is necessary. This includes all University Representatives, Consultants, Infection Prevention, Inspector of Record, Environmental Health & Safety, Engineers, Architects, etc.

4. People entering into the containment area will put on a full body disposable coverall with booties inside of the ante room before entering the containment area. Entry into the ante room requires one of the two zippered doors to be opened at one time to maintain the required negative pressure. After entering the ante room, the zipper shall be closed before leaving the ante room into the containment area.

B. Air Scrubbing

1. The **Contractor** shall place additional HEPA filtered fan units (negative air unit) inside of the project work area and operate them in recirculation mode or “scrub mode” near the final cleaning phase of the project to aide in additional particulate cleaning of the space. These units will circulate air internal to the containment area and scrub the air to reduce the total airborne particle concentrations inside of the containment area.

C. Disposable Coveralls and Booties

1. Disposable coveralls are required in all Class IV containment areas and selected to provide protection of street clothes from particulates generated inside of the containment area. Disposable coveralls shall be changed if they become ripped and are no longer serviceable. Disposable coveralls are required to protect the patients and are considered Patient Protective Apparel (PPA), since they are designed to protect patients who might be susceptible to the dust generating activity of the construction area.

2. Coveralls are not necessarily considered personal protective equipment (PPE), which is designed to protect the worker, unless the work activity involves asbestos, lead or other chemicals involved in the construction area.

3. Proper use of the disposable coveralls, booties and use of the sticky mat shall be followed at all times for all workers and UC Davis Health employees, when it is required by the ICRA Permit. At no time shall workers leave the containment area wearing disposable coveralls and booties. They are to be removed in the ante room or immediately in front of the ante room within the containment area if it is free and clean of debris. The workers shall remove all disposable coveralls and booties and place them in the plastic garbage bag and leave the ante room after walking on the sticky mat.

3.06 CONTAINMENT SET UP

A. Notify University's Representative forty-eight (48) hours prior to containment set up.

B. Build containment in compliance with ICRA, drawings and plans.

C. Notify University's Representative and EH&S for inspection prior to start of work. Before any demolition or construction begins, all Protection Areas (infection control areas), control measures put in place and work plan by the **Contractor** will be inspected by the University's Environmental Health & Safety Personnel, or by a designated representative of the University. Work cannot begin until the containment area has been inspected and approved, meeting all of the provisions of the ICRA Permit.

3.07 REMOVAL OF CONTAINMENT

A. Provide thorough cleaning of existing surfaces, which become exposed to dust, before leaving the containment area and before allowing staff and the public access to the project area.

B. Final cleaning of the containment area requires diligent HEPA vacuuming of all horizontal surfaces and wet wiping all surfaces. Clean towels, sponges, cloth rags or other means shall be used with clean water to effectively clean all surfaces within the containment area. Use of a measured solution of an EPA Listed Germicide is required as part of the final detail cleaning. Use an appropriate attachment to ensure all large dust is removed. Vacuum slowly and pay special attention to cracks and crevices where dust may have accumulated.

C. Prepare a measured solution of a University approved Environmental Protection Agency listed disinfectant and use according to the instructions on the label. Using clean towels or sponges, wipe all surfaces with the disinfectant. If visible dust accumulates on the applicator, wipe again until no reside is detected. Frequently change to clean applicators. Leave the surface wet and allow to air dry. Do not wipe dry.

D. Remove the top floor layer, if present and HEPA vacuum and wipe down the bottom floor layer. The inspection will not be performed until the containment is dry.

E. Additional HEPA filtered negative air units may be installed for scrubbing of particles (see 3.05 B).

F. Coordinate with the University's Representative to call for a final visual inspection of the containment area. The final visual inspection will be made after the **Contractor** has

thoroughly cleaned the entire containment area. The **Contractor** will be allowed to remove the containment barriers after the interior has passed the visual inspection for cleanliness.

G. Particle count assessment may be made inside of the containment area by the University's Representative as part of the final visual inspection process in addition to the final visual inspection. Particle testing will include testing the airborne concentration of various particle sizes compared to the concentration outside of the containment area. If particle counts inside of the containment area are significantly greater than outside of the containment area, the **Contractor** shall continue to scrub the air inside of the project area with HEPA filtered negative air units and conduct additional surface cleaning until subsequent particle testing has demonstrated particle concentrations inside of the containment area are not significantly greater than particle concentrations immediately outside of the containment area.

H. The University's Representative is required to provide a 24-hour notification to University Environmental Services that terminal cleaning will be needed, in addition to notification at the time the containment is being removed. Note that containment removal cannot take place until the Contractor has completed a full cleaning of the containment and the final visual inspection has passed.

3.08 ENTRY/EGRESS

A. Entry into the project containment area shall be through the ante room. Entry into the ante room requires one of the two zippered doors to be opened at one time to maintain the required negative pressure. After entering the ante room, the zipper shall be closed before leaving the ante room into the containment area. Equipment and supplies brought into the containment area shall be in sealed leak tight containers inside of rolling covered carts. Equipment, tools and supplies brought into the building shall be clean and free of dust, debris, mold and other contaminants. Cardboard products shall not be brought into the containment area if they are water damaged or have suspect mold growth.

B. All HEPA equipment when transported into and out of the containment area shall be cleaned of all debris on the surfaces and shall have the intake openings sealed with plastic and duct tape.

C. All workers leaving the containment area shall leave in clean clothes. At no time shall disposable coveralls or booties be worn when leaving the containment area through the anteroom into the public area. The workers shall clean all gross particulate debris from the coveralls using a HEPA filtered vacuum. Disposable coveralls can be taken off after gross debris has been removed from the disposable coveralls. The worker shall remove the disposable coverall inside of the ante room by rolling the disposable coverall inside out and then place it into a garbage container (plastic bag) located inside of the ante room or just inside of the project work area.

D. All equipment and supplies leaving the containment area shall be cleaned of all dust and debris before leaving the containment area. Removal of supplies, materials and waste debris from the containment area shall be using tightly covered containers/carts that contain the waste material. The wheels of carts shall be cleaned on a frequent schedule to minimize track-out of debris as they are removed from the containment area. All waste

material shall be in sealed leak tight containers. If plastic bags are used, they shall be 6 mil thick at a minimum.

3.09 ENFORCEMENT

A. Failure to maintain required containment will result in issuance of written warning; if situation is not corrected within eight (8) hours of receipt of warning, University will have cause to stop the work as provided in Article 2.1 (if Brief Form) or 2.3 (if Long Form) of the General Conditions. Any egregious violation of safety requirements shall be grounds for Immediate Work Stoppage.

3.10 Refer to the following Attachments

A. Infection Control Risk Assessment (ICRA) with Matrix of Precautions for Construction & Renovation: 3 Pages.

B. Infection Control Construction Permit: 1 Page.

C. UCDH Construction Dust & Hazardous Materials Inspection Worksheet: 1 Page.

D. ICRA Permit Extension Request and Instructions: 2 Pages.

E. UC Davis Health Construction Dust Infection Prevention Best Practice Standard: 23 Pages including.

1. Appendix A: Inspection Documentation Form and Daily Inspection Log.

2. Appendix B: Entry Warning Sign with Project Manager Contact.

3. Appendix C: Staff Education Poster.

END OF SECTION 01 56 10

UC DAVIS HEALTH

INFECTION CONTROL RISK ASSESSMENT

ICRA Committee approval of an ICRA Permit is required for all Construction Activity

BASIC PROJECT INFORMATION			
Project Name:	Project Number:	Today's Date	
Impacted Department(s):	Building Number and Name:	Floor:	Suite/Room:
Estimated Construction Start Date:	Estimated Completion Date:		
UCDH Project Manager:	UCDH PM Mobile Phone #:	UCDH PM Email:	
Construction Manager:	CM Mobile Phone:	CM Mobile Email:	

GENERAL PROJECT SCOPE

ATTACH DESCRIPTIVE PROJECT SCHEMATIC OR IMAGE TO PACKET

MULTIDISCIPLINARY TEAM		
Identify the multidisciplinary team that was included in the review of this packet and agree with the requirements identified within the packet.		
Department	Name	Email
UCDH Project Manager		
Fire Marshal's Office		
Infection Prevention		
Environmental Health & Safety		
Contractor Representative		
Other Multidisciplinary Team Members		

INFECTION CONTROL RISK ASSESSMENT

Step One: Using the table, identify the Construction Project Activity Type (A-E).

Type A ☐	**Inspection and non-invasive activities.** Includes but is not limited to: • Removal of ceiling tile for visual inspection-limited to 1 tile per 50 square feet with limited exposure time. • Limited building system maintenance (e.g., pneumatic tube station, HVAC system, fire suppression system, electrical and carpentry work to include painting without sanding) that does not create dust or debris. • Clean plumbing activity limited in nature.
Type B ☐	**Small-scale, short duration activities that create minimal dust and debris.** Includes but is not limited to: • Work conducted above the ceiling (e.g., prolonged inspection or repair of firewalls and barriers, installation of conduit and/or cabling, and access to mechanical and/or electrical chase spaces). • Fan shutdown/startup. • Installation of electrical devices or new flooring that produces minimal dust and debris. • The removal of drywall where minimal dust and debris is created. • Controlled sanding activities (e.g., wet or dry sanding) that produce minimal dust and debris.
Type C ☐	**Large-scale, longer duration activities that create a moderate amount of dust and debris.** Includes but is not limited to: • Removal of preexisting floor covering, walls, casework or other building components. • New drywall placement. • Renovation work in a single room. • Nonexistent cable pathway or invasive electrical work above ceilings. • The removal of drywall where a moderate amount of dust and debris is created. • Dry sanding where a moderate amount of dust and debris is created. • Work creating significant vibration and/or noise. • Any activity that cannot be completed in a single work shift.
Type D ☐	**Major demolition and construction activities.** Includes but is not limited to: • Removal or replacement of building system component(s). • Removal/installation of drywall partitions. • Invasive large-scale new building construction. • Renovation work in two or more rooms.
Type E ☐	**Exterior Construction typical activities.** include, but are not limited to: • Excavation, Trenching, Grading, Boring, Pile Driving, Demolition • Asphalt, Concrete, Stucco, Scaffolding • Roofing • Window washing, Caulking, Tuckpointing, Cleaning, Painting • Landscaping, Planting

Explain this Reasoning for this Assessment:

Step Two: Using the table below, identify the Patient Risk Group(s) that will be affected. If more than one risk group will be affected, select the higher risk group.			
Low Risk **Non-patient care areas such as:**	**Medium Risk** **Patient care support areas such as:**	**High Risk** **Patient care areas such as:**	**Highest Risk** **Procedural, invasive, sterile support and highly compromised patient care areas such as:**
☐Office areas not on clinical units ☐Breakrooms not on clinical units ☐Bathrooms or locker rooms not on clinical units ☐Mechanical rooms not on clinical units ☐EVS closets not on clinical units ☐Corridors and gathering areas not near clinical units	☐Waiting / Lobby areas ☐Clinical engineering ☐Materials management ☐Sterile processing department - dirty side ☐Cafeteria, gift shop, coffee shop, and food kiosks ☐Public hallways and gathering areas near clinical units	☐Patient care rooms and areas ☐All acute care units ☐Emergency department ☐Employee health ☐Pharmacy: General Work Zone ☐Medication rooms and clean utility rooms ☐Imaging suites: diagnostic imaging ☐Laboratory ☐Kitchen	☐All transplant and intensive care units ☐All oncology units and other areas with severely immunocompromised patients ☐OR theaters and restricted areas ☐Procedural suites ☐Pharmacy compounding ☐Sterile processing department: Clean side ☐Transfusion services ☐Dedicated isolation units and isolation rooms ☐Imaging suites: invasive imaging ☐ Dialysis unit
Describe key patient risks:			

Step Three: Match the Patient Risk Group (*Low, Medium, High, Highest*) from Step Two with the planned Construction Activity Project Type (*A, B, C, D, E*) from Step One using the table below to find the Class of Precautions (*I, II, III, IV or V*) or level of infection control activities required. The activities are listed in the table below – Minimum Required Infection Control Precautions by Class.					
	Construction Project Activity Type				
Patient Risk Group	TYPE A	TYPE B	TYPE C	TYPE D	TYPE E
LOW Risk	☐ I	☐ II	☐ II	☐ III*	☐ Exterior
MEDIUM Risk	☐ I	☐ II	☐ III*	☐ IV	
HIGH Risk	☐ I	☐ III	☐ IV	☐ V	
HIGHEST Risk	☐ III	☐ IV	☐ V	☐ V	
All construction and maintenance activities as defined in Step 1 require a permit and approval unless the work does not expose patients or employees and the ICRA Committee determines there is no appreciable risk to patients for acquired infection due to the project. Such decisions must be documented.					

Environmental conditions that could affect human health, such as sewage, Mold, asbestos, gray water, and black water will require Class of Precautions IV for LOW and MEDIUM Risk Groups and Class of Precautions V for HIGH and HIGHEST Risk Groups.

Class III* Precautions - Type C [Medium Risk groups] and Type D [Low Risk Groups] work areas that cannot be sealed and completely isolated from occupied patient care spaces should be elevated to include negative air exhaust requirements as listed in Class IV Precautions.

Surrounding Area Assessment

Step Four: Assess potential risk to areas surrounding the project. Using the table below, identify the surrounding areas that will be affected and the type of impact that will occur. If more than one risk group is impacted, select the higher risk group using Step 2 - Patient Risk Group.

Unit Location:	Below	Above	Lateral	Behind	Front
Unit Name:					
Risk Group:					
Unit Contact:					
Phone:					
Email:					
Additional Controls:	☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization	☐ Noise ☐ Vibration ☐ Dust control ☐ Ventilation ☐ Pressurization
Impact on other systems, such as:	☐ Data ☐ Mechanical ☐ Med Gases ☐ Water Systems	☐ Data ☐ Mechanical ☐ Med Gases ☐ Water Systems	☐ Data ☐ Mechanical ☐ Med Gases ☐ Water Systems	☐ Data ☐ Mechanical ☐ Med Gases ☐ Water Systems	☐ Data ☐ Mechanical ☐ Med Gases ☐ Water Systems
Notes:					

Were there discoveries in surrounding areas that would serve as cause to increase the class of precautions and necessitate additional controls? If so, please summarize.

NOISE AND VIBRATION ASSESSMENT

Type	Suggested Control Measures
☐ Drilling ☐ Heavy Equipment ☐ Motors ☐ Pounding ☐ Grinding ☐ Other: Click or tap here to enter text.	☐ **Required for high-impact activities** – Notify PO&M, Building Coordinator and EH&S ☐ Always consider using Engineering solutions before using Personal Protective Equipment. ☐ Coordinate disruption plan with PO&M and other stakeholders as necessary ☐ Deploy noise dampening blankets or other similar equipment ☐ Use tools or alternative methods designed to minimize noise and vibrations ☐ Use diamond drills instead of powder-actuated fasteners ☐ Use beam clamps instead of shot ☐ Prefab where possible ☐ Use tin snips to cut metal studs instead of using a chop saw ☐ Install metal decking with vent tabs, then use cellular floor deck hangers ☐ Consider pro-press instead of soldering, brazing, or welding ☐ Wet core drill instead of dry core or percussion ☐ Instead of jackhammering concrete, use wet diamond saws ☐ Use HEPA vacuums instead of standard wet/dry vacuums ☐ Use mechanical joining system sprinkler fittings instead of threaded ☐ Where fumes are tolerated, use chemical adhesive remover instead of mechanical ☐ To remove flooring, shot blast instead of using a floor scraper ☐ Use electric sheers instead of reciprocating saw for ductwork cutting. ☐ Install exterior man/material lifts. ☐ Provide staff and/or patients with noise-reducing protective equipment (e.g., ear plugs) ☐ Relocate members/staff to another area of the facility for the duration of the activity ☐ Notify affected areas before noise or vibration-producing activity ☐ Schedule activities during hours that minimize patient, visitor, and staff impact. Hours: Click or tap here to enter text. ☐ Other: Click or tap here to enter text.

AIR QUALITY IMPACT

Type	Suggested Control Measures
☐ Dust ☐ Chemical (VOC) ☐ Fugitive Emissions (Fumes) ☐ Potential Mold Note: If Mold is encountered, follow work practices outlined in the General Requirements Division 1 Section 01561 Document. ☐ Asbestos ☐ Paint Solvent/Cleaner ☐ Roofing Tar ☐ Other: Click or tap here to enter text.	☐ Restrict/shut down air handlers for the duration of activity ☐ Install temporary partitions ☐ Install charcoal filters in HVAC or portable units ☐ Install temporary ductwork and portable units ☐ Prohibit idling of heavy equipment engines ☐ Provide local exhaust ventilation ☐ Substitute material with low VOC product ☐ Notify area staff and EH&S before construction activity that may impact air quality ☐ Provide negative pressure/HEPA filtration ☐ Exhaust HEPA–99.97% to exterior ☐ Relocate members/staff to another area of the facility for the duration of the activity ☐ Schedule activities during hours that minimize patient, visitor, and staff impact. Hours: Click or tap here to enter text. ☐ Provide Safety Data Sheets to EH&S for other recommended actions ☐ Other: Click or tap here to enter text.

HAZARDOUS MATERIALS

A determination regarding the presence of hazardous materials in all UCDH buildings must be made before a project starts. This can be accomplished by existing surveys that identify the presence of hazardous materials or by hiring a consultant to perform a hazardous materials assessment of the areas that the project will impact. All impacted Hazardous Materials must be handled per the appropriate control measures.
Note: A Certified Asbestos Consultant must have conducted an asbestos survey before any demolition or renovation activity. There are no exceptions based on the date of construction or the facility's age.

ACKNOWLEDGEMENT OF HAZARDOUS MATERIALS		
Does the project contact hazardous materials (e.g., asbestos, lead, mold, PCBs, mercury)?	☐ Yes	☐ No

How was this verified?	☐ Hazmat Survey	☐ Personal Knowledge
	☐ Other:	
Who verified this information?	☐ Company:	
	☐ Person and Department:	
	☐ Other:	

Hazardous Materials Present in Project Work Area	Required Control Measures
☐ Asbestos ☐ Lead ☐ PCBs ☐ Universal Waste ☐ Other: Click or tap here to enter text.	Follow work practices outlined in the General Requirements Division 1 Document.

CONTAINMENT REQUIREMENTS WORKSHEET

Containment Barrier	**Where construction will impact fire-rated assemblies, the contractor is responsible for constructing interim assemblies and barriers that maintain the integrity of the structure's fire-rated system. Note: Interim Life Safety Measures may be required.**
	☐ Full Containment (poly over all surfaces within containment)
	☐ The ceiling plenum within the work area shall be isolated and sealed by fire-rated six mil. poly
	☐ Hard Barriers are recommended for work lasting greater than 30 days and in high-traffic areas.
	☐ Fire retardant plastic barriers are recommended for work lasting less than 30 days. Plastic Barriers cannot be used where hot work will be performed.
	☐ Isolated Room – Critical Openings Only (seal doors, supply and return registers, etc.)
	☐ Prefabricated Containment Cube (only large enough for 1-2 people; aka pop-up cube or Mini Cube)
	☐ Shrouded Tool with HEPA filtered exhaust
	☐ Glove Box Containment with HEPA filtered exhaust
	☐ Other:
Negative Pressure	The contractor is required to maintain and document negative air pressure. DOP Tested HEPA-filtered negative air machines (with a minimum of 99.97% efficiency) and a rating of 200 to 2000 cubic feet per minute (CFM) is required for construction activities.
	☐ -0.020" WC always displayed on a mounted digital manometer
	☐ -0.020" WC at setup with negative pressure throughout the project as displayed on the manometer
	☐ Visual Verification of some negative room pressure throughout the project
	☐ No negative room pressure required
	☐ Negative pressure in localized HEPA exhausted work area (e.g., shrouded tool, glove box)
	☐ Additional Ante room under negative pressure
	☐ Other:
Air Exhaust	☐ Air exhausted directly outside - Avoid exhausting air near air intakes or operable windows doors, and avoid exhausting air near walkways
	☐ For air exhausted inside, check any of the following conditions that are required:
	☐ Additional Filtration (ex. Charcoal, Diffuser system)
	☐ Exhaust into Ducts/HVAC system – Mechanical engineer must confirm that exhausted air will not negatively impact the air balance of the existing system
	☐ Onsite Challenge Testing (DOP or particle counting) before containment setup
	☐ Challenge Tested within last six months; Equipment has remained onsite at UCDH
Additional Containment Requirements	☐ Ante Room ☐ Masonite Floor Protection ☐ Protective Clothing ☐ Air Scrubber
	☐ Walk Off Mats ☐ Shoe Covers ☐ Collect Samples During Work ☐ HEPA Vacuum
	☐ Other:
Verification of Work	☐ HEPA Equipment Verification ☐ EH&S ☐ Consultant ☐ Other:
	☐ Pre-Work Approval Inspection ☐ PM ☐ EH&S ☐ Consultant ☐ IOR ☐ Other:
	☐ Daily Onsite Oversight ☐ PM ☐ EH&S ☐ Consultant ☐ IOR ☐ Other:
	☐ Post Demolition/Abatement Inspection ☐ PM ☐ EH&S ☐ Consultant ☐ IOR ☐ Other:
	☐ ICRA Downgrade ☐ PM ☐ EH&S ☐ Consultant ☐ IOR ☐ Other:
	☐ Final Visual Containment Inspection ☐ PM ☐ EH&S ☐ Consultant ☐ IOR ☐ Other:
	☐ Air Sampling ☐ EH&S ☐ Consultant ☐ Other:
Air Sampling	☐ Particle Counting ☐ Mold ☐ Asbestos ☐ Other: Frequency:
Air Balance in Adjacent Areas:	The contractor is responsible for maintaining air balance in adjacent high and highest-risk areas per design/ASHRAE guidelines. Contact PO&M to verify the air balance requirements of surrounding areas.
	Adjacent High/Highest Risk Areas / **Air Balance Requirements**
	Positive/negative pulldown

		Positive/negative pulldown

ICRA Permit Number	ICRA Class
23-00001	Choose an item.

Project Number:	Project Name:		
Impacted Department:	Building Number and Name:	Floor:	Suite/Room:
UCDH Project Manager:	UCDH PM Mobile Phone #:	UCDH PM Email:	
Construction Manager:	CM Mobile Phone:	CM Mobile Email:	
General Contractor:	General Contractor Mobile Phone:	General Contractor Mobile Email:	
Containment will be set up and maintained by:	Third-Party Containment Consultant:		

ICRA Class Choose an item.		**Project Start Date**	**Completion Date**
Additional Requirements			
Signatures	Project Manager	General Contractor	Infection Control and Prevention
Downgrade Request – ICRA Class Choose an item.		**Project Start Date**	**Completion Date**
Additional Requirements			
Signatures	Project Manager	General Contractor	Infection Control and Prevention
Extension Request – ICRA Class Choose an item.		**Project Start Date**	**Completion Date**
Additional Requirements			
Signatures	Project Manager	General Contractor	Infection Control and Prevention

INFECTION PREVENTION REQUIREMENTS - CLASS I	
Prior to and During Construction:	• Perform noninvasive work activity as to not block or interrupt patient care. • Perform noninvasive work activities in areas that are not directly occupied with patients. • Perform noninvasive work activity in a manner that does not create dust. • Immediately replace any displaced ceiling tile before leaving the area and/or at end of noninvasive work activity.
Upon Completion of Work:	Cleaning • Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. • Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. HVAC Systems • Remove isolation of HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. • Verify the HVAC systems meet original airflow and air exchange design specifications.
	Additional Infection Prevention Requirements:

INFECTION PREVENTION REQUIREMENTS - CLASS II	
Prior to and During Construction:	• Perform only limited dust work and/or activities designed for basic facilities and engineering work. • Perform limited dust and invasive work following standing precautions procedures approved by the organization. • This Class of Precautions must never be used for construction or renovation activities.
Upon Completion of Work:	Cleaning: • Clean work areas including all environmental surfaces, high horizontal surfaces, and flooring materials. • Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. HVAC Systems: • Remove isolation of the HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. • Verify the HVAC systems meet original airflow and air exchange design specifications.
	Additional Infection Prevention Requirements:

INFECTION PREVENTION REQUIREMENTS - CLASS III

Prior to and During Construction:	• Provide active means to prevent airborne dust dispersion into the occupied areas. • Means for controlling minimal dust dispersion may include hand-held HEPA vacuum devices, polyethylene plastic containment, or isolation of work area by closing room door. • Remove or isolate return air diffusers to avoid dust from entering the HVAC system. • Remove or isolate the supply air diffusers to avoid positive pressurization of the space, • If work area is contained, then it must be neutrally to negatively pressurized at all times. *If negative pressure is required, see additional requirements below. • Seal all doors with tape that will not leave residue • Contain all trash and debris in the work area. • Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area. • Install a sticky (dust collection) mat at entrance of contained work area based on facility policy. Sticky mats must be changed routinely and when visibly soiled. • Maintain clean surroundings when area is not contained by damp mopping or HEPA vacuuming surfaces.
	Additional requirements for Class III containments that require negative pressure: • Maintain negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows requires the highest degree of filtration feasible. • If exhaust is directed indoors, then the system must be HEPA filtered. Prior to start of work, HEPA filtration must be verified by particulate measurement as no less than 99.97% efficiency and must not alter or change airflow/pressure relationships in other areas. • Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is not acceptable. • Install digital monitoring manometer with one thousandth of inch of water pressure (eg. -0.024) exterior of work containment to continually monitor negative pressurization. The non-digital manometer monitors are not acceptable.
Upon Completion of Work:	Cleaning: • Clean work areas including all environmental surfaces, high horizontal surfaces, and flooring materials. • Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. HVAC Systems: • Remove isolation of the HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. • Verify the HVAC systems meet original airflow and air exchange design specifications.
	Class III precautions require inspection and documentation for downgraded ICRA precautions. Construction areas must be inspected by the designee on the containment requirements worksheet for discontinuation or downgrading of ICRA precautions. Work Area Cleaning:

	• Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. • Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. Removal of Critical Barriers: • Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed. • All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust release. Use the following precautions when removing hard barriers: o Carefully remove screws and painter tape. o If dust will be generated during screw removal, use hand-held HEPA vacuum. o Drywall cutting is prohibited during removal process. o Clean all stud tracks with HEPA vacuum before removing outer hard barrier. o Use a plastic barrier to enclose area if dust could be generated. Negative Air Requirements: • The use of negative air must be designed to remove contaminates from the work area. • Negative air devices must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers. HVAC systems: • Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed. • Verify that HVAC systems are clean and operational. • Verify the HVAC systems meets original airflow and air exchange design specifications.
	Additional Infection Prevention Requirements:

INFECTION PREVENTION REQUIREMENTS - CLASS IV

Prior to and During Construction:

- Construct and complete critical barriers meeting NFPA 241 requirements. Barriers must extend to the ceiling or if ceiling tile is removed, to the deck above.
- All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to ground and ceiling and secure from movement or damage. Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor.
- Seal all penetrations in containment barriers, including floors and ceiling, using approved materials (UL schedule firestop if applicable for barrier type).
- Containment units or environmental containment units (ECUs) approved for Class IV precautions in small areas totally contained by the unit and that has HEPA-filtered exhaust air (MiniCube Mobile Containments).
- Remove or isolate return air diffusers to avoid dust entering the HVAC system.
- Remove or isolate the supply air diffusers to avoid positive pressurization of the space.
- Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized.
- Maintain negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows requires the highest degree of filtration feasible.
- If exhaust is directed indoors, then the system must be HEPA filtered. Prior to start of work, HEPA filtration must be verified by particulate measurement as no less than 99.97% efficiency and must not alter or change airflow/pressure relationships in other areas.
- Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is not acceptable.
- Install digital monitoring manometer with one thousandth of inch of water pressure (eg. -0.024) exterior of work containment to continually monitor negative pressurization. The non-digital manometer monitors are not acceptable.
- Contain all trash and debris in the work area.
- Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area.
- Worker clothing must be clean and free of visible dust before leaving the work area. HEPA vacuuming of clothing or use of cover suites is acceptable.
- Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed.
- Install a sticky (dust collection) mat at entrance of contained work area based on facility policy. Sticky mats must be changed routinely and when visibly soiled.
- Collection of particulate data during work may be collected to assure that contaminates do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies. Collection of particulate data may be collected by Environmental Health and Safety or approved third party consultant.

Upon Completion of Work:	**Class IV precautions require inspection and documentation for downgraded ICRA precautions.**
	Construction areas must be inspected by the designee on the containment requirements worksheet for discontinuation or downgrading of ICRA precautions.
	Work Area Cleaning:
	• Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials.
	• Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces.
	Removal of Critical Barriers:
	• Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed.
	• All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust release. Use the following precautions when removing hard barriers:
	  ○ Carefully remove screws and painter tape.
	  ○ If dust will be generated during screw removal, use hand-held HEPA vacuum.
	  ○ Drywall cutting is prohibited during removal process.
	  ○ Clean all stud tracks with HEPA vacuum before removing outer hard barrier.
	  ○ Use a plastic barrier to enclose area if dust could be generated.
	Negative Air Requirements:
	• The use of negative air must be designed to remove contaminates from the work area.
	• Negative air devices must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers.
	HVAC systems:
	• Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed.
	• Verify that HVAC systems are clean and operational.
	• Verify the HVAC systems meets original airflow and air exchange design specifications.

	Additional Infection Prevention Requirements:

INFECTION PREVENTION REQUIREMENTS - CLASS V

Prior to and During Construction:

- Construct and complete critical barriers meeting NFPA 241 requirements. Barriers must extend to the ceiling or if ceiling tile is removed, to the deck above.
- All (plastic or hard) barrier construction activities must be completed in a manner that prevents dust release. Plastic barriers must be effectively affixed to ground and ceiling and secure from movement or damage. Apply tape that will not leave a residue to seal gaps between barriers, ceiling or floor.
- Seal all penetrations in containment barriers, anteroom barriers, including floors and ceiling using approved materials (UL schedule firestop if applicable for barrier type).
- Construct anteroom large enough for equipment staging, cart cleaning, workers. The anteroom must be constructed adjacent to entrance of construction work area.
- Personnel will be required to wear coveralls at all times during Class V work activities. Coveralls must be removed before leaving the anteroom.
- Remove or isolate return air diffusers to avoid dust entering the HVAC system.
- Remove or isolate the supply air diffusers to avoid positive pressurization of the space.
- Negative airflow pattern must be maintained from the entry point to the anteroom and into the construction area. The airflow must cascade from outside to inside the construction area. The entire construction area must remain negatively pressurized.
- Maintain negative pressurization of the entire workspace by use of HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows requires the highest degree of filtration feasible
- If exhaust is directed indoors, then the system must be HEPA filtered. Prior to start of work, HEPA filtration must be verified by particulate measurement as no less than 99.97% efficiency and must not alter or change airflow/pressure relationships in other areas.
- Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (bathroom exhaust) is not acceptable.
- Install digital monitoring manometer with one thousandth of inch of water pressure (eg. -0.024) exterior of work containment to continually monitor negative pressurization. The non-digital manometer monitors are not acceptable.
- Contain all trash and debris in the work area.
- Nonporous/smooth and cleanable containers (with a hard lid) must be used to transport trash and debris from the construction areas. These containers must be damp-wiped cleaned and free of visible dust/debris before leaving the contained work area.
- Worker clothing must be clean and free of visible dust before leaving the work area anteroom.
- Workers must wear shoe covers prior to entry into the work area. Shoe covers must be changed prior to exiting the anteroom to the occupied space (non-work area). Damaged shoe covers must be immediately changed.
- Install a sticky (dust collection) mat at entrance of contained work area based on facility policy. Sticky mats must be changed routinely and when visibly soiled.
- Collection of particulate data during work may be collected to assure that contaminates do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies. Collection of particulate data may be collected by Environmental Health and Safety or approved third party consultant.

Upon Completion of Work:	**Class IV precautions require inspection and documentation for downgraded ICRA precautions.**
	Construction areas must be inspected by the designee on the containment requirements worksheet for discontinuation or downgrading of ICRA precautions.
	Work Area Cleaning:
	• Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials.
	• Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces.
	Removal of Critical Barriers:
	• Critical barriers must remain in place during all work involving drywall removal, creation of dust and activities beyond simple touch-up work. The barrier may NOT be removed until a work area cleaning has been performed.
	• All (plastic or hard) barrier removal activities must be completed in a manner that prevents dust release. Use the following precautions when removing hard barriers:
	  ○ Carefully remove screws and painter tape.
	  ○ If dust will be generated during screw removal, use hand-held HEPA vacuum.
	  ○ Drywall cutting is prohibited during removal process.
	  ○ Clean all stud tracks with HEPA vacuum before removing outer hard barrier.
	  ○ Use a plastic barrier to enclose area if dust could be generated.
	Negative Air Requirements:
	• The use of negative air must be designed to remove contaminates from the work area.
	• Negative air devices must remain operational at all times and in place for a period after completion of dust creating activities to remove contaminants from the work area and before removal of critical barriers.
	HVAC systems:
	• Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed.
	• Verify that HVAC systems are clean and operational.
	• Verify the HVAC systems meets original airflow and air exchange design specifications.

	Additional Infection Prevention Requirements:

INFECTION PREVENTION REQUIREMENTS – EXTERIOR	

Prior to and During Construction:	• Identify and confirm fugitive fume and dust control measures are in place prior to work starting i.e., charcoal filters at air intakes, scrubbers on equipment etc.
	• Contractor must submit an excavation and trenching plan for review and implementation.
	• Install fencing, physical barriers and interior/exterior signage to re-direct pedestrian and vehicular traffic as necessary.
	• If locally required, validate soil survey was performed to identify potential contaminants (e.g., valley fever, radon, legionellosis, etc.).
	• Ensure that fugitive dust control measures are adhered to (e.g., work area is kept wet).
	• Validate those fumes created by equipment and material is controlled.
	  o If required, install charcoal filters on air intake to building.
	  o Maintain equipment exhaust scrubbers if working near sensitive areas or near air-intake
	  o Minimize equipment idling
	• Validate barriers restricting access and signage into construction work areas are maintained.

Upon Completion of Work:	• Ensure all control measures are removed at completion of project.
	Additional Infection Prevention Requirements:

UC DAVIS HEALTH

Construction Dust Infection Prevention Best Practice Standard Version 4.0 - January 2023

TABLE OF CONTENTS

Purpose 2
Setting 2
Definitions 2
Responsibilities 3
- Project Manager 3
- Contractor 4
- Containment Inspectors 4
- Environmental Health and Safety 4
- Infection Prevention 5
- Environmental Services 5
- Consultants 5

Policy 5
- Training 5
- Experience 6
- Contractors 6
- Consultants 6
- Containment inspectors 7
- Equipment 7

Procedure 7
- Work Practices 7
- Protective Clothing 8
- Decontamination 8
- Personnel 8
- Equipment & Wastes 9

Containment Design & Construction 9
- Location 9
- Materials 9
- Construction 9
- Negative Pressure Requirements 10
- Alternative Containment Strategies 11
- Mobile Containments, aka “Cubes” 11
- “Glove” Bags or Boxes & HEPA Shrouds 11
- Dehumidification 12
- Postings 13
- Cleaning Procedures 13
- Documentation 13
- Containment Verification 13

Inspection Criteria 14
- Initial Containment Inspection (aka “Pre-start”) - EH&S or Consultant ONLY 14
- Daily Inspections 14
- In-Progress Inspections (aka “post-Demo”) 15
- ICRA Class Change (aka “ICRA Downgrade”) 15
- Final Inspection BEFORE Dismantlement (aka “Final Visual”) 15

References 15
Appendix A: Construction Inspection Log 17
Appendix B: Entry Warning Sign with Project Manager Contact 17

PURPOSE

This document represents the minimum best practice standards to prevent the acquisition of nosocomial infection in patients due to exposure to potentially infectious or harmful dust created by construction, renovation, or maintenance activities.

Aspergillus fungal spores carried on dust particles are the most common cause of construction-related infection in healthcare settings. Overall mortality from a healthcare construction and renovation-related fungal infection is 50%. Infection due to construction in healthcare facilities is estimated to cause 5,000 deaths each year in the United States.

The Project Manager, Infection Prevention, and Environmental Health & Safety will audit performance to this standard, as amended by the needs of specific projects. All users of this standard are authorized to contact EH&S directly with questions or for consultation.

SETTING

All work has been evaluated by IP and EH&S and received an Infection Control Risk Assessment (ICRA) permit for construction, remodeling, maintenance, or repair activities at the University of California, Davis Health (UCDH) facilities. This includes external construction and work at leased facilities where owner-provided contractors are used. Work in non-patient care areas such as the School of Medicine and medical research facilities may be excluded.

This standard does not apply to projects contacting hazardous materials, such as asbestos, lead, chemical, or radioactive materials. Projects involving hazardous materials must undergo additional assessment and approval processes. If hazardous materials are discovered during work, immediately contact UCDH Environmental Health & Safety (EH&S) and Infection Prevention (IP) for additional risk assessment.

DEFINITIONS

Anteroom – a small room connected to the entrance of the negative pressure containment, used for donning/doffing protective clothing and adding a layer of insulation between the containment and hospital environment; required on Class IV and V containments.

Containment – a system of barriers and/or negative pressure equipment that isolates the construction zone air space from the adjacent hospital environment.

Critical Barrier – barrier sealed over critical openings into the work area such as HVAC vents, doorways, electrical outlets, gaps in a drop in ceilings, or other openings.

DOP test – filter challenge test; a standard recognized method to test the integrity of a HEPA filter using dispersed oil particulate (DOP) and particle counting techniques which a specialty contractor performs.

HEPA filter – High-Efficiency Particulate Air (HEPA) filter removes 99.97% of particles 0.3 micrometers and is even more efficient for particles of other sizes.

Immunocompromised – having a weakened immune response due to an infection, disease, or immunosuppressive agents such as medication or irradiation.
Infection Control Risk Assessment (ICRA) – process which evaluates patient risk due to construction activities focused on reducing the risk of infection; based on a matrix of the affected patient population and the invasiveness of the work. This assessment generates a permit issued by Infection Prevention requiring compliance with one of five precaution levels (classes). See UCDH Hospital Policy and Procedure 2004.

In writing – written, hard copy, or electronic communications. Electronic communications must be retained in the same manner as hard-copy documents.

Manometer – electronic pressure measuring instrument sensitive to measuring one-thousandth of an inch of water pressure (e.g., -0.024" wp).

Negative pressure – pressure within a system that is less than the environment that surrounds that system; having atmospheric pressure that is less than the ambient atmospheric pressure—examples: vacuum flask (thermos) interstitial space, airborne infectious agent isolation room.

Nonporous – free from minute spaces or holes (pores) where contamination may be trapped; smooth.

Nosocomial Infection – hospital-acquired infection; infection contracted from the environment, staff, or operations of a healthcare facility.

Particle Counting – method of determining ambient particulate concentrations of various sized airborne particles using a laser diode and photodetector; not specific to the nature of the sampled particle.

Poly – polyethylene sheeting; plastic film sheeting used to contain contamination.

Positive pressure – pressure within a system that is greater than the environment that surrounds that system; having atmospheric pressure that is greater than the ambient atmospheric pressure. Example: inside of an inflated balloon or tire.

Patient Care Area – a location where patient care is provided, not limited to direct treatment, and can include waiting rooms, lobbies, food service areas, and other places throughout the facility where patients may be present. Infection risks are elevated in these locations as immunocompromised patients are concentrated.

RESPONSIBILITIES

All parties to this standard must primarily act in the best interests of patients and patient care, regardless of the impact on project timelines or other constraints.

PROJECT MANAGER

The Project Manager (PM) is the Facilities Planning and Development (FP&D) or Plant Operations and Maintenance (PO&M) representative overseeing project execution. The PM oversees the Contractor or in-house personnel performing the work. A third-party construction manager may supplement the PM's duties, but the UCDH PM retains all responsibility under this best practice standard.
The project manager shall ensure the following:

- All work is performed under an approved ICRA
- An Interim Life Safety Measure (ILSM) plan is created, if necessary
- Coordination with work area stakeholders regarding the potential impacts on patient care, including the containment location, project duration, and any changes during construction
- This best practice document is followed throughout the duration of the project
- A qualified consultant is hired for projects (as determined by agreement between FP&D and EH&S) and projects which take place after hours or on weekends
- Plans and specifications (bidding documents) are developed per this best practice standard
- Containment inspectors and consultants perform to this best practice standard
- Contractor expectations are communicated in writing before the start of work
- The Contractor must comply with plan specifications and approved ICRA permit precautions.
- Routine containment inspections are performed and documented by a trained, qualified containment inspector
- Project documentation is maintained
- Containment failures or severe breaches of practice are communicated to EH&S and IP in writing as soon as possible
- Root causes of failures are determined, and corrective action is taken to prevent future episodes
- Work is stopped for excessive noise/vibration, breach of containment, non-compliance with this best practice standard, or other patient care is compromised by the work
- Environmental Services (EVS) is contacted for a terminal clean of the project area after a successful final inspection and containment dismantlement

CONTRACTOR

The Contractor is responsible for complying with all provisions of plans, specifications, and approved ICRA permit precautions to control construction dust at the project site. These provisions include witnessed DOP testing of all HEPA-filtered equipment.

The Contractor shall ensure that all site workers, including subcontractors, are knowledgeable of the requirements of plans, specifications, and approved ICRA permit precautions and the reasons for controlling construction dust. The Contractor is required to stop work at times of excessive noise or vibration when containment is breached, when this standard is not being complied with, and when directed by the PM, EH&S, or IP.

CONTAINMENT INSPECTORS

Containment inspectors may perform any of the inspections listed in the “Inspection Criteria” section except for the initial containment inspection (aka “Pre-start”). Containment inspectors must be trained by EH&S (or a qualified consultant) and report to the PM and EH&S.

ENVIRONMENTAL HEALTH AND SAFETY

Environmental Health and Safety (EH&S) is responsible for providing consulting services related to this best practice standard, auditing containment inspector and consultant performance, and updating these best practices document.

EH&S is responsible for ensuring either EH&S or the consultant performs the following:

- Witness DOP testing of HEPA-filtered equipment or perform particle count challenge testing in rare cases

- Complete site inspections according to this best practice standard (must perform the pre-start inspection and approve of the containment design)
- Audits of contractor performance, including particle counting
- Training of containment inspectors
- Environmental sampling, as needed
- Investigation of containment failures
- Stop work for excessive noise/vibration, breach of containment, non-compliance with this best practice standard, or other patient care is compromised
- Along with IP, approve any deviations to this best practice standard

INFECTION PREVENTION

The Department of Hospital Epidemiology and Infection Prevention (IP) is involved in many facets of the control and prevention of nosocomial infections at UC Davis Health System, including infections from construction dust. The IP Department reviews and approves Infection Control Risk Assessments (ICRAs) of construction projects; along with EH&S, approves temporary deviations to this best practice standard to support unique scenarios; and approves this best practice standard document. IP may audit compliance with this Standard and has the authority to stop work for: excessive noise/vibration, breach of containment, non-compliance with this standard, or other project issues compromising patient care.

ENVIRONMENTAL SERVICES

Environmental services (EVS) personnel perform terminal cleaning of project areas once containments have been removed (per UCDH Hospital Policy and Procedure). The PM must provide a 24-hour notification to EVS that terminal cleaning will be needed, in addition to notification when the containment is being removed. Note that containment removal cannot occur until the Contractor has completed a full cleaning of the containment, and the final visual inspection has passed. EVS personnel also occasionally perform final clean inspections for some work.

CONSULTANTS

Consultants retained by FP&D or PO&M provide project scoping, planning, specification, and work plan development, project monitoring for compliance with this standard, and inspection services. EH&S shall approve consultants based on education, training, and experience before beginning billable work. Consultants may only use qualified employees trained and experienced with infection prevention and construction dust control in a hospital setting. Consultants shall be directed by the PM and shall communicate with EH&S and the PM.

POLICY

All work that has received an ICRA Class III*, IV, or V permit must be completed using a negative pressure containment system to separate the construction air space from the hospital environment. This system comprises an enclosed work area and HEPA-equipped filtration units providing negative pressure to the work area. The following policies shall apply to all personnel working with negative pressure containments at UCDH facilities.

TRAINING

All personnel working with negative pressure containments shall be trained and knowledgeable in the following:

- ICRA Permit contents and requirements
- Site-Specific Containment plan
- Provisions of this best practice standard
- Requirements in Section 01561 Airborne Contaminant Control Specifications
- Infection risks associated with construction
- Methods to control the dissemination of dust and fungal spores
- Proper use of protective clothing
- Proper entry and exit procedures
- Manufacturer's requirements, where manufactured containment systems are used (e.g., cubes)
- How to respond to a loss of negative pressure or too much negative pressure
- Breach in Practice response and required notifications
- Contractors shall be additionally trained in the following:
- Proper containment design, construction, and maintenance techniques
- Proper load-out techniques for equipment/wastes
- Containment cleaning regime: daily, final, and terminal cleaning
- Containment Failure Emergencies caused by the Contractor may require retraining at the discretion of the PM, IP, or EH&S. Training is to be provided by EH&S, or an EH&S-approved training provider, such as a consultant.

EXPERIENCE

Contractors, consultants, and containment inspectors shall demonstrate the following experience requirements before performing duties under this standard.

CONTRACTORS

To be considered qualified to work with negative pressure containments, contractors must demonstrate experience by providing either of the following:

- Previously completed, documented negative pressure containment work in a healthcare facility along with an owner reference. Minimum documentation shall include project descriptions and photographs or containment schematics.
- Documentation that the contactors' proposed onsite Foreman and onsite Supervisor has successfully obtained one of the following from the American Society for Healthcare Engineering (ASHE):
- Certified Healthcare Constructor (CHC) Certification;
- Health Care Construction (HCC) Certificate; or
- Managing Infection Prevention During the Construction & Operation of Health Care Facilities Course Completion

CONSULTANTS

To be considered qualified to work with negative pressure containments, consultants must demonstrate all the following:

- Hands-on oversight by a Certified Industrial Hygienist (CIH) in good standing with the American Board of Industrial Hygiene (ABIH)
- Field personnel shall be experienced in Healthcare Construction Infection Prevention and shall possess certification in good standing by Cal/OSHA as a California Certified Asbestos Consultant (CAC) or Certified Site Surveillance Technician (CSST)

- Owner references for previously completed, documented negative pressure containment oversight work in healthcare facilities

CONTAINMENT INSPECTORS

Containment inspectors may be trained in-house UCDH personnel or outside, third-party consultants. EH&S shall approve all containment inspectors before commencing inspection tasks. Approval shall include ensuring familiarity with the following:

- The operation, maintenance, and inspection of HEPA-filtered equipment
- Methods to achieve and maintain negative pressure in containments
- Methods to monitor negative pressure
- Inspection elements and documentation requirements

EQUIPMENT

Equipment used for construction containments must arrive free and clean of any debris or significant dust. Equipment that cannot be thoroughly decontaminated must arrive wrapped in 6 mil (0.006 inches) polyethylene sheeting, be used only within negative pressure containment, be wrapped before transport out of the containment, and be transported offsite in a covered cart.
All polyethylene sheeting shall be flame retardant and at least six mils thick. Waste bags shall be six mils thick.

All HEPA-filtered equipment must be tested before being utilized to ensure the integrity of the filter and housing. The equipment will be tested onsite by standard dispersed oil particulate (DOP) challenge testing using a certified independent testing contractor. In rare cases or emergencies, EH&S or an approved consultant may perform onsite particle challenge testing of HEPA-filtered equipment. A legible label indicating the date tested, testing party, and expiration date must be affixed to the equipment for it to be considered compliant with this best practice standard.

Both DOP and particle tests shall be valid for six months from the date of initial testing, provided the Contractor certifies and can verify that the machines have remained at the same building with the same filters in place since initial testing and have not been moved, modified, inverted, or roughly handled in that time. Previously tested equipment removed from the building shall be tested before being reutilized onsite.

PROCEDURE

Best practice procedures must be used wherever possible when working with negative pressure containment systems.

WORK PRACTICES

To minimize the creation of airborne dust, capture and control dust as close to the source of generation as possible. Use water mist, HEPA vacuums, vacuum tool attachments, and/or other methods to prevent the spread of dust within the containment.

Clean as you go and clean up promptly. Vacuum up dust as it is generated. Vacuum out exposed cavities as soon as they are made accessible. The Contractor shall perform daily cleaning of the containment interior by HEPA, vacuuming any noticeable dust, and bagging up debris. Do not leave debris in an unoccupied containment.

The Contractor shall inspect the containment before starting work and immediately repair any breaches, holes, or other issues.

Stop work and notify the PM immediately if unforeseen hazardous materials (including mold) are discovered during construction. This condition will warrant a reassessment of the project by IP and EH&S.

Use only tested, HEPA filter-equipped vacuums. Do not use standard shop vacuums; all vacuums without HEPA filters are dust distributors.

Avoid dry sweeping, dry shoveling, or other dry debris cleanups. Use a water mist or sweeping compound before sweeping or shoveling debris. Do not use compressed air on dust or debris.
In occupied areas, provide an effective means of diffusing the air exhausted from HEPA-filtered negative air machines.

PROTECTIVE CLOTHING

Class IV and V containments require protective clothing, including shoe covers. The purpose of this clothing is to protect street clothing from becoming contaminated during work and prevent the track out of dust.
Shoe covers may be attached to protective suits or may be worn separately. Head coverings are not required unless dust creation is expected to be extensive, as in the case of abrasive blasting or concrete coring, or head exposure is likely, as in the case of attic crawling. Protective clothing may be disposable (e.g., Tyvek suits) or reusable and regularly laundered.

Note that disposable suits are not typically fire-resistant and, therefore, not intended for hot work environments. If fire-resistive clothing is necessary, it must be brought onsite in a sealed bag, used only within containment, and re-bagged and sealed before offsite transport.

DECONTAMINATION

To avoid tracking construction dust in the hospital environment, workers and equipment must be carefully decontaminated before exiting the containment.

PERSONNEL

For exceptionally dusty work, before removing protective clothing, clean the outside surface using a HEPA equipped vacuum or damp towel/sponge frequently rinsed in clean water. Do not use disinfectants to wipe skin or protective clothing to avoid chemical hazards.

If respiratory protection is used, remove protective clothing before removing the respirator.
When removing protective clothing, roll the suit outwards and down the body such that the exterior side is rolled into itself and only the clean side of the suit is exposed. Only touch the inside (clean side) of the suit. Step out of the suit and discard it into a waste bag for disposal or a plastic bag for laundering. If shoe covers are not attached to the suit, remove them by rolling the dirty side onto itself.
Step onto the tack mat several times to remove fugitive dust before stepping onto the flooring outside the work area. Note: The sticky mat is not intended to clean the bottom of the booties. They are designed to clean the bottom of the work boots/shoes after removing booties or full-body coveralls.
When working in semi-restricted or restricted areas, put on clean protective clothing before entering the semi-restricted or restricted area located outside the negative pressure containment.

Wash face, hands, and any exposed skin surfaces as soon as possible upon exiting containment. A wash station near the work area may be required for dusty work.

EQUIPMENT & WASTES

Decontaminate the exterior surface of all bagged waste, tools, or construction materials before the exit of the containment by wet wiping. Tools or materials that cannot be exposed to water may be thoroughly HEPA vacuumed before removal.

Contaminated construction materials, tools, or other reusable items contaminated with dirt or debris must be wrapped in 6 mil plastic sheeting or bags any time they are outside the containment and before covered cart transport. Insides of transport carts shall be maintained free and clean of dust and debris.
Nonporous/smooth and cleanable containers with a hard lids must be used to transport trash and debris from the construction areas. Before leaving the contained work area, these containers must be damp-wiped, cleaned, and free of visible dust/debris. Open carts or plastic-covered carts are unacceptable.

CONTAINMENT DESIGN & CONSTRUCTION

Containment is the primary engineering control to prevent patient exposure to contamination. Proper containment design and construction are necessary for proper function. The following sections are related to whole, negative pressure containments; alternative containment strategies are presented in the next section.

LOCATION

Nurse management must approve the containment location and configuration in patient care areas. Containment location concerning emergency egress must be reported to UCDH Fire Marshal's Office. An Interim Life Safety Measure (ILSM) plan may be required.

MATERIALS

Temporary containments in non-fire-rated locations lasting less than 30 days may be constructed of fire-rated polyethylene sheeting (at least six mil in thickness) that meets the standards specified by the UCDH Fire Marshal's Office. The polyethylene used for critical barriers and sealing walls, floors, or ceiling systems shall be a minimum of 6 mil thickness and fire-retardant type listed by Fire Underwriters Laboratories, Griffolyn #T55R with Griffolyn fire retardant tape, or equal, (no known equal).

Only approved one-hour fire-rated temporary containment systems that meet ASTM E84, Class A requirements for smoke and fire for fire-rated assemblies/enclosures shall be used. Only approved fire damper systems used to control smoke/fire in a fire-rated containment assembly shall be used.

Containments to remain in place for more than 30 days, those requiring additional security or those designed to control highly dusty environments, as in the case of abrasive blasting or concrete coring, shall be constructed of rigid, airtight materials, such as drywall and metal wall framing. A hard-sided containment with a lockable door shall be used when there are concerns about security or safety from unauthorized entry, especially if the containment will be left unattended for extended amounts of time.
Avoid creating tape damage on existing finish materials.

CONSTRUCTION

Locate the HEPA-filtered negative pressure unit as far away from the containment entrance (or other location of makeup air) as possible and duct the exhaust outdoors whenever feasible. Distancing the negative pressure unit from the source of makeup air helps to ensure complete and effective scrubbing of the contained airspace. Locating the unit too near the entrance can allow pockets of contamination to exist within the contained zone. At least four air changes per hour must be provided within the negative pressure containment at all times, which can be determined by the number of HEPA-filtered negative air unit scrubbers operating cubic feet per minute and the volume of the containment. All sources of air infiltration into the work zone must be sealed off before erecting containment barriers. These critical barriers include those over HVAC supply and return registers, electrical outlets, gaps in the drop-in ceilings, doorways not being used, etc.

All existing surfaces within the containment which are not to be disturbed during construction must be covered with polyethylene sheeting unless they are nonporous, smooth, and accessible for cleaning. Where floors are likely to be damaged by the construction activities, durable flooring (e.g., plywood, Masonite) shall be installed over two layers of plastic sheeting.

Locate tack mats outside of the containment exit when possible. Otherwise, locate tack mats on the floor, just inside the containment exit. An additional tack mat may be useful for incredibly dusty projects. Expose a new tack sheet when tack mats are no longer sticky and again at the end of each shift. The use of wetted carpet mats is not acceptable.

When required, a manometer displaying the current containment pressure must be installed in an accessible location near the containment entrance.

NEGATIVE PRESSURE REQUIREMENTS

Negative pressure containments shall be a minimum of -0.020 inches of water column or less (-0.021, -0.022, -0.023….) relative to the adjacent, uncontained space. Exceptions to this requirement may be allowed by IP and will be listed on the ICRA permit. Demonstrate negative pressure is achieved continuously (24/7) through an electronic manometer sensitive to measure down to -0.020” wp. The manometer shall be capable of measuring the water pressure down to at least -0.001” in-WC. Inclined manometers using a liquid water solution and non-digital air pressure gauges are unacceptable since they do not meet the sensitivity of measuring -0.001” WC.

Zero pressure or positive pressure is unacceptable and must be responded to immediately. Locate and repair holes or breaches in the exterior containment system with tape. Secure zip poles if they have fallen. Close the entry door by zipping lower or closing the flaps and securing it. A pressure too negative (-0.060 inches of water column or less) can cause the containment to collapse inwards. To relieve too negative pressure, turn down the negative air machines, if possible, and increase the size of the containment door openings.

Manometer Reading	Why it’s a problem	Response Options
Positive Pressure (+0.001 and greater)	Active contaminant ejection	This is an emergency. Call Project Manager ASAP!
No pressure (0.000)	Possible contaminant migration	Close zipper doors, Check and repair breaches, Ensure correct operation of negative air machines, and Call Project Manager.
Too Negative (-0. 060 and less)	Could collapse containment	Lift the zipper on the containment and anteroom door

ALTERNATIVE CONTAINMENT STRATEGIES

A full negative pressure enclosure is not always possible or warranted. Work may be completed using alternative containment strategies such as those listed below. IP may approve other alternative containment strategies on a case-by-case basis.

MOBILE CONTAINMENTS, AKA "CUBES"

Cubes are manufactured containment systems that are erected on a mobile platform. Examples are pictured on the following page. They are most often used for Class III or IV work and must conform to all Class III or IV ICRA permit requirements, including negative pressure, cleaning, inspection, required postings, etc.

Cubes are not typically inspected at the same frequency as fixed containments as the work is often of short duration and may occur in several locations throughout a single day.

The containment inspector shall conduct periodic, unannounced audits of cube work to ensure compliance with the ICRA and this best practice standard. Inspect cube operations two times or more for each ICRA permit issued. Projects longer than two weeks shall be audited at least twice per month. Where failures are located, corrective action must be taken immediately.

EXAMPLES OF MOBILE CONTAINMENTS OR "CUBES"





"GLOVE" BAGS OR BOXES & HEPA SHROUDS

Small projects may be accomplished by containing the work only - and not the workers. Glove bags, boxes, and HEPA shrouds can be used to complete work that disturbs small areas. Some examples of these systems are pictured on the following page.

EXAMPLES OF GLOVE BAGS OR BOXES





EXAMPLES HEPA SHROUDED SYSTEMS







Projects commonly completed using these systems include drilling small penetrations, cutting in for wire receptacles, and placing backing plates for hanging objects from the wall. Because the containment cannot be posted, display the required postings (including the ICRA permit) in the work area.
Before first use, the design and construction of these types of containments shall be approved by IP and EH&S.

The glove bag or box should be composed of a sturdy frame enclosed in polyethylene or a transparent, sturdy material (e.g., plastic panel). Do not use corrugated materials, as they tend to collect and retain dust. A tested HEPA vacuum is used to maintain negative pressure within the glove bag/box. The bag/box must be cleaned before detachment. The negative pressure may be verified by observing the bowing of the bag/box sides, using visible smoke, tissue paper, or other means approved by EH&S.

Work utilizing these types of containments is typically very short in duration; therefore, inspections differ from those performed in fixed containments. Further, because these types of systems heavily rely on the work practices used, contractors must be strictly monitored, especially at the beginning of a project.

The containment inspector shall conduct periodic, unannounced audits of the work to ensure compliance with the ICRA permit and this best practice standard. Where failures are located, corrective action must be taken immediately, and EH&S must be notified immediately.

DEHUMIDIFICATION

Dry-out efforts using dehumidifiers are allowed if completed within 72 hours of initial wetting and are approved by EH&S and/or IP. If the duration of the wetting is unknown, additional measures must be performed to ensure no mold growth has occurred – consult with EH&S.

Dehumidification may only be used in clean water or steam condensate intrusion cases. Materials wetted by contaminated, black, or grey water require measures beyond dehumidification, ideally removal and replacement.

Dehumidification of voids such as wall or ceiling cavities must be done as a closed loop such that the space does not become positively pressured relative to patient care areas.

POSTINGS

All the following postings must be maintained in the work area at all times a Class I-V permitted project is in progress:

- Copy of ICRA Permit
- Copy of Interim Life Safety Measure (ILSM) Permit
- Conatinment Inspection Log (See Appendix A)
- Entry Warning Sign with Project Manager Contact (See Appendix B)

CLEANING PROCEDURES

Once all work has been completed within containment, use the following procedures to perform a final cleaning. Final cleaning must be verified and signed off by the containment inspector before removing the containment.

- Change into a clean disposable suit or clean clothing.
- Carefully HEPA Vacuum all surfaces. Use an appropriate attachment to ensure all large dust is removed. Vacuum slowly and pay special attention to cracks and crevices where dust may have accumulated.
- Prepare a measured solution of a UCDH-approved EPA-listed disinfectant (see UCDH Hospital Policy and Procedure 2111) and use it according to the instructions on the label.
- Using clean towels or sponges, wipe all surfaces with disinfectant. If visible dust accumulates on the applicator, wipe again until no residue is detected. Frequently change to clean applicators.
- Leave the surface wet and allow it to air dry. Do not wipe dry.
- Remove the top floor layer, if present, and HEPA vacuum and wipe down the bottom floor layer.
- Call for a final visual inspection. The inspection will not be performed until the containment is dry.
- If the containment does not pass inspection, the entire containment must be re-cleaned using the steps outlined above before re-inspection.
- When containment passes inspection, remove the components, retain the documents for the project manager, and contact EVS for terminal cleaning of the project area.

DOCUMENTATION

The project manager shall retain all the following documents related to the containment:

- Copy of ICRA permit
- Containment Inspection Log (see Appendix A) and any Manometer Logs
- Copies of HEPA equipment certification
- Records of sampling conducted, if any
- Findings from project audits
- Documents should be retained until the project is completed and occupancy has been granted.

CONTAINMENT VERIFICATION

Periodic particle counting is recommended and may be required to ensure exhausted air meets the HEPA rating and ambient air near the project is not excessively loaded with particles, compared to baseline measurements collected before construction or measurements collected in areas deemed currently acceptable. Particle counters should be set to log the collected data, and all sampling records must be provided to the project manager and EH&S.

INSPECTION CRITERIA

Inspections are required: at the initial containment setup to verify proper construction each day to ensure a proper operation once all demolition has been completed, whenever an ICRA reclassification is requested, and when all work has been completed, and the containment has been cleaned. The requirements of each of these types of inspections follow.

INITIAL CONTAINMENT INSPECTION (AKA "PRE-START") – EH&S OR CONSULTANT ONLY

To ensure the containment is sufficient before the start of work, EH&S or the consultant shall check for the following and sign off on the posted "inspection documentation form" with their name and the date and time the pre-start inspection passed.

- ☐ ILSM permit conditions are met (if applicable)
- ☐ All equipment is free and clear of dust/debris or arrives wrapped in poly
- ☐ A hard lid-covered cart is available for waste transport
- ☐ HEPA-filtered equipment has passed inspection and is not expired
- ☐ Protective clothing is available
- ☐ HVAC is sealed off in the work area, and other critical barriers are in place
- ☐ Containment is complete (no holes/gaps) and structurally sound
- ☐ Negative pressure exhaust is located as far from containment entry as possible
- ☐ Nonporous, non-cleanable surfaces not in the scope are covered in poly
- ☐ Fixtures outside of the scope of work are covered or removed
- ☐ Where floor damage may occur, durable floor protection is in place
- ☐ Installed manometer displays sufficient negative pressure
- ☐ Negative pressure exhaust is diffused/not directing high-velocity air onto occupants
- ☐ All required postings are in place

INSPECTIONS WHILE WORKING

Containment inspections shall be performed at least once per workday. For projects of extended length when work activity is not being performed, including on weekends or holidays, and if the work area had a comprehensive surface cleaning and received a passing visual inspection by a third-party environmental consultant, the daily inspections are not required. At a minimum, ICRA inspections shall be made weekly for containments on projects of extended non-work activity. Containment checks shall include the following. The containment inspector shall note observations on the "Containment Inspection Form" (see Appendix A) attached to the containment.

- ☐ ILSM permit conditions are met (if applicable)
- ☐ Containment remains complete (no holes/gaps/tears) and structurally sound
- ☐ No unauthorized personnel are inside
- ☐ All required postings are in place
- ☐ No changes to the location of the HEPA exhaust
- ☐ The Tack mat is present and usable
- ☐ No signs of track out are observed
- ☐ Installed manometer displays sufficient negative pressure
- ☐ Containment is generally clean
- ☐ Covered carts with hard lids are being used to transport equipment and wastes
- ☐ All ICRA permit conditions are met

IN-PROGRESS INSPECTIONS (AKA "POST-DEMO")

To ensure completion of the demolition phase of projects, the containment inspector shall verify the following conditions and sign off on the containment documentation form with their name and the date and time the inspection was completed.

- ☐ All wetted or hazardous materials have been removed entirely (May require using infrared cameras and/or moisture meters to verify remaining materials are dry).
- ☐ The demolition scope is complete
- ☐ No hazardous materials have been discovered
- ☐ Containment is clean, and waste has been removed

ICRA CLASS CHANGE (AKA "ICRA DOWNGRADE")

At times, with the approval of IP, construction work may begin under ICRA Permit Class III, IV, or V and become reclassified to a lower ICRA Class once significant dust-producing activities have ceased. An inspection must take place before the downgrade to ensure that the dust-producing work is complete, the Class III or IV containment is clean, and the IP requirements of the ICRA permit downgrade are met. The containment must meet the criteria for a "final visual inspection" (see next section), except for all construction efforts being complete.

FINAL INSPECTION BEFORE DISMANTLEMENT (AKA "FINAL VISUAL")

Once the construction is complete, a containment inspector shall verify the following and document a passing final inspection by signing the inspection log form attached to the containment, including the date and time the inspection passed. Before dismantling the containment, the Contractor shall collect all posted paperwork, including any manometer tapes, and deliver it to the Project Manager, who is responsible for contacting EVS for the terminal cleaning.

- ☐ All construction efforts are completed
- ☐ No tools, equipment, or personal belongings are present (clean ladder excepted)
- ☐ No debris or wastes are present
- ☐ The Tack mat is clean
- ☐ Containment is "white glove" clean – no visible dust can be wiped from any surface

REFERENCES

The following sources were used to gather information for this policy.

Bartley, J. APIC State-of-the-Art Report: The role of infection control during construction in health care facilities. American Journal of Infection Control, 28(2):156–69.

Clair JD, Colatrella S. Opening Pandora's (tool) Box: health care construction and associated risk for nosocomial infection. Infect Disord Drug Targets. 2013 Jun;13(3):177-83.

Facilities Guideline Institute (2014). Guidelines for design and construction of hospitals and outpatient facilities. American Hospital Association.

Grota, P, et. al. (Eds.) (2014) APIC Text of Infection Control and Epidemiology. (4th Ed.) Association for Professionals in Infection Control and Epidemiology.

Kanamori H, Rutala WA, Sickbert-Bennett EE, Weber DJ. Review of fungal

outbreaks and infection prevention in healthcare settings during construction and renovation. Clin Infect Dis. 2015 Aug 1;61(3):433-44.

Kidd F, Buttner C, Kressel AB. Construction: a model program for infection control compliance. Am J Infect Control. 2007 Jun;35(5):347-50.

Public Health Agency of Canada. (2001) Construction-related nosocomial infections in patients in healthcare facilities: Decreasing the risk of aspergillus, legionella, and other infections. Ottawa, Ontario: Health Canada.

Rask D, Dziekan B, Swiencicki W, Heinsohn P, Walmsley D. (1998) Air quality control during renovation in health care facilities. In: Healthy buildings: solutions to global and regional concerns. Atlanta, GA: ASHRAE Inc Press; 1998.

Sehulster L, Chinn RY. (2003) Guidelines for environmental infection control in healthcare facilities. Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC). Morbidity and Mortality Weekly Report – Recommendations and Reports, 2003, 52(RR-10):1-42.

Sendelbach S, Funk M. Alarm fatigue: a patient safety concern. AACN Adv Crit Care. 2013 Oct-Dec;24(4):378-86.

Vogel R, et. al. (2015). Infection prevention manual for construction and renovation. Association for Professionals in Infection Control and Epidemiology.

Permit Number:	UCDH Project Manager:	UCDH Project Manager Phone Number:
Project Number:	Project Name:	Alternate Contact:

CONTAIMENT INSPECTION LOG

Type of Inspection Pre Start, Post Demo, Downgrade, Final or Work Day	Date & Time	Performed by (Name & Company)	Pressure Reading (+/-)	Acceptable Negative Pressure? (Yes/No)	ILSM conditions still met? (Yes/No or N/A)	Tack Mat useable? (Yes/No)	Interior free of dust and debris? (Yes/No)	Containment Integrity Intact? (Yes/No)	All ICRA permit conditions met? (Yes/No)	Other Issues? (Explain)	Corrective Actions
Example Work Day	01/13/23 0800	B. Clean ACME Construction	-0.025	Yes	N/A	Yes	Yes	No	Yes	No	Containment Breach; Patched

Caution

Construction Dust Precautions In Use
Do Not Enter

For More Information Contact the UCDH Project Manager

_____

(Name)

_____

Phone Number

This sign must be posted in color

SECTION 01 61 00

PRODUCT REQUIREMENTS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Product Options

B. Product Substitutions

C. Product Transportation and Handling Requirements

D. Product Storage and Protection

E. Product System Completeness

1.02 RELATED SECTIONS

A. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

B. Section 014100 – REGULATORY REQUIREMENTS

C. Section 014500 – QUALITY CONTROL

1.03 PRODUCTS

A. Product Selection: Provide products that comply with Contract Documents, are undamaged and unused at installation.

B. Product Completeness: Provide products complete with all accessories, trim, finish, safety guards and other devices needed for complete installation and for intended use and effect.

C. Products: Items purchased for incorporation in Work, whether purchased for project or taken from previously purchased stock; this includes materials, equipment, assemblies, fabrications and systems.

1. Named Products: Items identified by manufacturer's product name, including make or model designation 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 part of the Work.

3. Equipment: A product with operating parts, whether motorized or manually operated, requiring connections such as wiring or piping.

D. Specific Product requirements: Refer to requirements of Section 014500 – QUALITY CONTROL and other Sections in Division 2 through 49 for specific requirements for products.

E. Code Compliance: All products, other than commodity products prescribed by Code, shall have current listing service report or research report. Minimum Requirements: Specified requirements are minimum requirements.

F. Interchangeability: To fullest extent possible, provide products of the same kind from single source. Products supplied in quantity shall be same product and interchangeable throughout the Work. When options are specified for selection of any of two (2) or more products, product selected shall be compatible with products previously selected.

G. Nameplates: Except for required labels and operating data, do not attach manufacturer's name plates or trademarks on surfaces exposed to view in occupied spaces or on the exterior of building.

H. Equipment Nameplates: Provide permanent nameplate on each item or service-connected or power-operated equipment. Locate on inconspicuous accessible surface. Nameplate shall contain the following information and essential operating data:

1. Name of product and manufacturer

2. Model and serial number

3. Capacity and Speed

4. Ratings and other pertinent information

I. Listing Service: Products, for which listing service standards have been established and for which their service label is available, shall bear the appropriate listing service label.

1.04 PRODUCT OPTIONS

A. Products Specified Only by Description: Where the Contract Specifications describe a product, listing characteristics required, with or without use of a brand name, provide a product that provides the appropriate characteristics and otherwise complies with the requirements.

B. Performance Specification: Where Contract Specifications require compliance with performance requirements, provide products that comply and are recommended for application. Manufacturer's recommendations may be contained in Product literature, or by certification of performance.

C. Compliance with Standards: Where Contract Specifications require compliance with a standard, select a product that complies with the standard specified.

1. Wherever catalog numbers and specific brands or trade names followed by the designation "to match existing” are used in conjunction with product(s) required by the Contract Specification, no substitution will be considered.

D. Products Specified by Naming One (1) or More Manufacturers:

1. Specified manufacturer(s): Provide specified product(s) of the specified manufacturer. Wherever more than one (1) manufacturer's product is specified, the first-named product is the basis for the design used in the Work and the use of alternative-named products or substitutes may require modifications in that design. If such alternatives are proposed by **Contractor** and are approved by University, **Contractor** shall assume all costs required to make necessary revisions and modifications to the design, including additional costs to University for evaluation of revisions and modifications of the design resulting from the substitutions submitted by **Contractor**.

   a. When materials and equipment are specified by first manufacturer's name and product number, second manufacturer's name and "or equal" supporting data for second manufacturer's product, if proposed by **Contractor**, shall be submitted in accordance with the requirements for substitution.

2. Quality Standard: Products(s) of the specified manufacturer shall serve as standard by which the product(s) of other named manufacturers are evaluated.

E. "Or Equal" Provision: Catalog numbers and specific brands or trade names followed by the designation "or equal" are used in conjunction with material and equipment required by Contract Specification to establish standard of quality, utility, and appearance required.

1. "Or Equal" Products: Equivalent products of manufacturers other than the specified manufacturer may be provided if determined by University's Representative to be acceptable in accordance with substitution provisions following:

   a. **Contractor** shall submit to University's Representative, within thirty-five (35) calendar days after the date of commencement of the Work specified in the Notice to Proceed, a list in excel format containing Specification Section number with extension i.e. 088000 2.B.1.a. with descriptions of each product proposed for substitution.

   b. **Contractor** shall provide supporting data as required herein.

   c. University will evaluate **Contractor**'s proposal. The decision of University shall be final.

   d. University will accept, in writing, proposed substitutions that are in University's opinion equal in quality, utility and appearance to the product specified. Such acceptance does not relieve **Contractor** from complying with requirement of the Contract Documents.

e. **Contractor** shall be responsible for all costs of any changes resulting for **Contractor**'s proposed substitutions that affect other work, or the Work of Separate **Contractor**.

f. Failure to place orders for specified products sufficiently in advance of required date for incorporation into the Work will not be considered justification for **Contractor** to request a substitution or deviation from requirements of the Contract Documents. The sixty (60) calendar day submittal period does not excuse **Contractor** from completing the Work within the Contract Time.

2. **Contractor**'s Determination: Prior to submitting "or equal" product(s) for consideration, **Contractor** shall review and determine product(s) meet or exceed the quality and warranty provisions of the specified product.

3. Late Substitution Requests: If a request for substitution occurs after the sixty (60) calendar day period, the substitution may be reviewed at the discretion of University and the costs of such review, as approved by University, shall be deducted from the Contract Sum.

a. Product Availability Waiver: Substitutions will be considered after the sixty (60) calendar day period only when a product becomes unavailable due to no fault of the **Contractor**.

F. Visual Matching: Where Contract Specifications require matching a sample, University's decision on proposed product match is final. If no product matches and complies with other requirements, comply with provisions for "substitutions" for selection of a matching product in another category.

G. Visual Selection: Where requirements include the phrase "….as selected from manufacturer's standard colors, patterns, textures…" or a similar phrase, select a product that complies with other requirements. University's Representative will select color, pattern and texture from the product line selected.

1.05 SUBSTITUTIONS

A. Substitutions: Requests for changes in products, materials, equipment, and methods of construction required by Contract Documents proposed by the **Contractor** after award of the Contract shall be considered "substitutions". The following are not considered substitutions:

1. Revisions to Contract Documents requested by University's Representative or University's Consultant.

2. Specified options of products and construction methods included in Contract Documents.

3. Compliance with governing regulations and orders issued by governing authorities.

B. Substitution Provisions: Requests for Substitutions will only be considered if **Contractor** submits the following data:

1. Furnish complete technical data including drawings, performance specifications, samples, test reports and any additional information required by University's Representative, for each product proposed for substitution.

    a. Submit ONE (1) PDF file with bookmarks.

    b. In reviewing supporting data for substitution, University will use, for purpose of comparison, all characteristics of Basis of Deign specified product as it appears in manufacturer's published data even though all characteristics may not have been particularly mentioned in the Contract Specifications. If more than two (2) substitutions of supporting data are required, University's costs of reviewing additional supporting data will be deducted from the Contract Sum.

    c. Submit statement indicating substitution's effect on the Construction Schedule, if any.

    d. Submit cost information, including proposal of net deduction, if any, from Contract Sum.

2. Furnish statement by **Contractor** that proposed substitution is in full compliance with requirements of Contract Documents and Applicable Codes.

3. Provide a Comparison Table as part of the substitution request listing the design and performance criteria of the Basis of Design specified product with the proposed substitution product side by side. The design and performance criteria shall include but not limited to; size, thickness, gauge, strength, function, ASTM rating, test report data, manufacturing association standards & data, technical properties & performance data, traffic or weather resistance, quality assurance data, warranty and other design and performance criteria list in Basis of Design manufactures specification and written material.

4. Furnish list of Subcontractors, if any, that may be affected by the substitution.

5. If proposed substitution requires portions of the Work to be redesigned or removed in order to accommodate substituted product, submit design and engineering calculations prepared by the licensed design professional of record.

6. Contract Document Revisions: Should **Contractor**-proposed or alternate sequence or method of construction require revision of Contract Documents, including revisions for purpose of determining feasibility, scope or cost, or revisions for the purpose of obtaining approval by governing authorities having jurisdiction, revisions will be made by University's Consultant who is the design professional of record.

    a. Services of University's Consultants, including time spent in researching and reporting on proposed substitutions or alternate sequences and methods of construction, shall be paid by **Contractor** when such activities are considered additional services to the design services contracts of University.

b. Cost of services by University's Consultants shall be paid on a time and material basis, based on current hourly fee schedules, with reproduction, long distance telephone and shipping costs reimbursable. Such fees shall be paid whether or not the proposed substitution or alternate sequence or method of construction is ultimately accepted by University and Change Order executed. Such fees owed shall be deducted from the Contract sum on the next Application for Payment.

7. Submit all proposed substitutions in writing to University using the Request for Substitution form provided at the back of this Section.

C. University may reject any substitution not proposed as described above and presented within the time prescribed.

D. Revisions to submittals: If University's Representative, in reviewing list of substitutions, requires revisions or corrections to previously accepted Shop Drawings and supplemental supporting data, **Contractor** shall promptly do so. If any proposed substitution is judged by University's Representative to be unacceptable, the specified product shall be provided at no cost to the University.

E. Samples: Samples may be required. Tests required by University's Representative for determination of quality and utility shall be made by **Contractor**'s independent testing Laboratory, at expense of **Contractor**, with prior University acceptance of test procedure.

1.06 TRANSPORTATION, DELIVERY AND HANDLING

A. Transport products by methods to avoid product damage.

B. Schedule delivery to minimize long-term storage and prevent overcrowding construction spaces. Coordinate with installation to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

C. 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. Provide equipment and personnel to handle products by methods to prevent soiling, marring or other damage.

E. Promptly inspect products on delivery to ensure products comply with Contract Documents, quantities are correct, and to ensure products are undamaged and properly protected. Promptly remove damaged or defective products from site and replace at no adjustment to the Contract Sum and/or Contract Time.

1.07 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions, with seals and labels intact and legible.

B. Store products to facilitate inspection and measurement of quantity or counting of units.

C. Store heavy materials away from structures in a manner that will not endanger supporting construction.

D. Store sensitive products in weather-tight enclosures. Store products subject to damage by the elements above ground, under cover in a weather-tight enclosure, with ventilation adequate to prevent condensation.

1. Maintain temperature and humidity within range required by manufacturer's instructions.

2. Exterior Storage:

a. Store products above ground on blocking or skids to prevent soiling, staining and damage.

b. Cover products that are subject to damage by the elements with impervious protective sheet coverings. Provide adequate ventilation to prevent condensation.

c. Store sand, rock, aggregate or other loose granular material in well-drained area on solid surfaces. Prevent mixing with foreign matter.

3. Arrange storage to provide access for inspection. Periodically inspect to assure products are undamaged and maintained under required conditions, free from damage and deterioration.

E. Protection After Installation: Provide barriers, substantial coverings, notices and other materials or methods as necessary to protect installed work from traffic, subsequent construction operations and weather.

1. Maintain temperature and humidity conditions in interior spaces for Work in accordance with manufacturers' instructions for materials and equipment being protected.

2. Remove protective measures when no longer required and prior to Acceptance of the Work.

1.08 SYSTEM COMPLETENESS

A. The Contract Drawings and Contract Specification 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.

B. It is intended that 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.

C. **Contractor** is urged to report to University's Representative immediately when elements essential to proper execution of the Work are discovered to be missing or misdescribed in the Contract Documents or if the design intent is unclear.

D. Should an essential element be discovered as missing or misdescribed prior to receipt of bids or establishing a negotiated Contract Sum, an Addendum or Clarification will be issued so that all cost may be accounted in the Contract Sum.

E. Should an obvious omission or misdescription of a necessary element be discovered and reported after execution of the Agreement, **Contractor** shall provide the element as though fully and correctly described.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 INSTALLATION OF PRODUCTS

A. Comply with manufacturer's instructions and recommendations for installation of products.

B. Anchor each product securely in place, accurately located and aligned with other Work. Clean exposed surfaces and protect to ensure freedom from damage and deterioration at time of Substantial Completion.

3.02 Refer to the following Attachment:

A. Request for Substitution Form.

END OF SECTION 01 61 00

REQUEST FOR SUBSTITUTION

Substitution #: _____ **Submittal #:** _____ **Date:** _____

Project#: _____ **HCAI#:** _____

PROJECT NAME: _____

TO: UC DAVIS HEALTH **Facilities Design & Construction** **4800 2ND Avenue, Suite 3010** **Sacramento, CA95817** **P: 916-734-7024** **Attn.: Atosa Abedini** **aabedini@ucdavis.edu**	**FROM:** _____

Name of Party Submitting Request for Substitution: _____

Reason for Submitting Request for Submission: _____

Specification Section and Paragraph #: _____

Substitution Manufacturer name and address: _____

Proposed substitution (trade name of product, model or catalog #): _____

Fabricators and Suppliers (as appropriate): _____

PRODUCT DATA:
ATTACH PRODUCT DATA AS SPECIFIED IN SPECIFICATION SECTION 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

Similar projects using product (list dates of installation and names/phone numbers of Owners):

_____

_____

_____

_____

Similar comparison of proposed substitution with specified product (indicate variation(s), and reference each variation to appropriate Specification Section paragraphs):

-ATTACH COMPARISON SUMMARY-

(SUBSTITUTION REQUEST CONTINUES)

Quality and performance comparison between proposed substitution and specified product:

Availability of maintenance services and replacement materials:

Effect of proposed substitution on Construction Schedule:

Effect of proposed substitution on other work or products:

SECTION 01 73 00

CUTTING AND PATCHING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Requirements and limitations for cutting and patching Work.

B. Hazardous Conditions Permit requirements for brazing, welding and other hot work.

1.02 RELATED SECTIONS

A. Section 011100 – SUMMARY OF THE WORK

B. Section 013100 – COORDINATION

C. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

D. Section 015610 – AIRBORNE CONTAMINANTS CONTROL

E. Section 016100 – PRODUCT REQUIREMENTS

F. Individual Specifications Sections.

1. Cutting and patching incidental to Work specified in this Section.

2. Coordination with work in other Sections for openings required to accommodate Work specified in those other Sections.

1.03 SUBMITTALS

A. **Contractor** shall complete and submit for review to University's Representative, a Coring/Sawcutting Form, included at the end of this Section, and obtain written authorization for University prior to the commencement of any dig activities. **Contractor**

shall include all pertinent information with the Coring/Saw cutting Form and submit with detailed work plan fourteen (14) calendar days prior to desired coring/cutting activity.

1. Structural integrity of any element of Project.

2. Integrity of weather-exposed or moisture-resistant element.

3. Efficiency, maintenance, or safety of any operational element.

4. Visual qualities of sight-exposed elements.

5. Work of University.

6. Utility supply, drains, fire alarm, communication.

B. Include in request:

1. Identification of Project, including University's Project Name and Project Number.

2. Location and description of affected Work.

3. Necessity for cutting and patching.

4. Description of proposed work, and products to be used.

5. Alternatives to cutting and patching.

6. Effect on work of University.

7. Written permission of University.

8. Date and time work will be executed.

1.04 NOTIFICATIONS

A. Before starting welding or cutting work involving the use of gas or electric welding equipment, or any brazing work involving gas or electric brazing equipment **Contractor** shall complete the online Hazardous Conditions Permit form at https://health.ucdavis.edu/fire/. **Contractor** shall allow seventy-two (72) Hours for Fire Marshal's approval and issuance of Hazardous Conditions Permit. This permit will be issued without cost to **Contractor** and may be applicable to more than one (1) building. **Contractor** shall be responsible for reporting to Fire Department either by telephone or in person at beginning and end of each day's work. Provide minimum written notice of fourteen (14) calendar days prior to such activities.

1. Welding and brazing personnel must be certified by a University or HCAI approved laboratory and must maintain this certification during the work of this Contract.

2. **Contractor** is responsible for notifying University of all apparent locations where suspect asbestos containing materials may be present or discovered during the course of the project such as cement pipes or other insulated material, which may be a result of newly excavated materials below grade or after building systems are opened such as within wall, ceiling or subfloor spaces. When any such location is

discovered by **Contractor**, information relating thereto shall be immediately communicated to University's Representative.

3. Where welding and cutting activity is required and suspect painted surfaces are present that will be impacted by the welding or cutting activity, the contractor shall request from the University's Representative information regarding laboratory analysis for lead or other hazardous metals in the painted metal components before any cutting or welding is performed. The contractor shall refer to Section 013500 Special Procedures, 1.05 Hazardous Materials Procedures regarding materials impacted by welding and cutting activity.

4. **Contractor** shall then follow any and all instructions as indicated by University's Representative.

PART II - PRODUCTS

2.01 MATERIALS

A. Product substitution: For any proposed change in materials, submit request for substitution under provision of SECTION 016100 – PRODUCT REQUIREMENTS. Use only materials for cutting, fitting, and patching which comply with the applicable

Specification Sections, and which match adjacent materials. Use materials whose installed performance will equal or surpass that of existing materials.

PART III - EXECUTION

3.01 EXAMINATION

A. General: Execute cutting, fitting and patching including excavation and fill, to complete Work and:

1. Fit the several parts together, to integrate with other work.

2. Uncover work to install ill-timed work.

3. Remove and replace defective and non-conforming work.

4. Remove samples of installed work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical work.

B. Examination, General: Inspect existing conditions prior to commencing Work, including elements subject to damage or movement during cutting and patching.

1. After uncovering existing Work, inspect conditions affecting proper accomplishment of Work.

2. Beginning of cutting or patching shall be interpreted to mean that existing conditions were found acceptable by **Contractor**.

C. Ground Penetrating Radar: Determine by Ground Penetrating Radar all existing reinforcing, conduit and piping located in concrete walls and slabs prior to demolition. Clearly mark all locations and review with University Representative prior to demolition.

3.02 PREPARATION

A. Temporary Supports: Provide supports to assure structural integrity of the Work. Provide devices and methods to protect other portions of Project from damage.

B. Weather Protection: Provide protection from elements in all areas that may be exposed by uncovering work. Maintain excavations free of water.

C. 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.

D. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas. Do not block required exit ways or stairs.

E. Protect rated floor, wall and ceiling assemblies. Prior to cutting opening in a rated assemblies review with University’s Representative and get written approval form the Fire Marshal.

3.03 CUTTING AND PATCHING

A. Execute cutting, fitting, and patching to properly complete Work.

B. Coordinate installation or application of products for integrated Work.

C. Uncover completed Work as necessary to install or apply products out of sequence.

D. Remove and replace defective or non-conforming Work.

E. Provide openings in the Work for penetrations of mechanical and electrical Work.

F. Provide cutting and patching to accommodate all demolition work as part of this contract. Provide level and plumb cuts at locations that will be exposed or to provide smooth and even surface for patching to existing work or surfaces.

G. Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

3.04 PERFORMANCE

A. Execute cutting and patching by methods to avoid damage to adjoining Work, and that will provide appropriate surfaces to receive final finishing.

B. Execute cutting and patching of weather-exposed, moisture-resistant and sight-exposed surfaces by methods to preserve weather, moisture and visual integrity.

C. Restore work with new Products as specified in individual Sections of Contract Documents.

D. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval from University. Coordinate timing of all sawing and cutting work with the University's Representative. Do not over saw cut corners and intersection unless written authorization is provided from the University Representative and the Structural Engineer of Record.

E. Fit work neat and tight allowing for expansion and contraction. Butt new finishes to existing exposed structure, pipes, ducts, conduit, and other penetrations through surfaces.

F. At penetrations of firewalls, partitions, ceiling, or floor construction, completely seal voids with UL approved fire-rated assembly. Provide temporary closures at the end of each workday. Closures shall be approved by the University Fire Marshal.

G. Refinish surface to match adjacent finish. For continuous surfaces, refinish to nearest intersection, corner or natural break and from floor to ceiling. For an assembly, refinish unit. All patched surfaces from new to existing shall provide a smooth and even transitions aligning with the adjacent surface with no visible marks, joints, seams, sheen, texture or color difference.

H. Where new construction is to join with or match existing work, it shall be finished exactly to that work so as to form a complete unified and finished element.

I. Visual Requirements: Do not cut and patch operating elements or related components in a manner that would, in the University's Representative's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in

visual evidence of cutting and patching. Remove and replace construction cut and patched in a visually unsatisfactory manner, including by not limited to.

1. Repair and patch in areas where finishes have been visually disturbed by cutting and patching to the nearest intersections.

2. Processed concrete finishes

3. Firestopping

4. Acoustical ceilings

5. Flooring

6. Carpeting

3.05 Refer to the Following Attachment

A. Coring/Sawcutting Notification

END OF SECTION 01 73 00

CORING/SAWCUTTING NOTIFICATION

LOCATION: _____ PROJECT#: _____
TITLE: _____

TRACKING NUMBER:
(Provided by PO&M) _____

HCAI #: _____ DATE: _____

TO: **Facilities Design & Construction**
UC Davis Health
4800 2nd Avenue, Suite 3010
Sacramento, CA 95817
P: 916-734-7024
aabedini@ucdavis.edu

FROM:

SCOPE:

HAS USA BEEN NOTIFIED? ☐ *YES* ☐ *NO* *When?* _____

ARE ALL KNOWN UTILITIES MARKED? ☐ *YES* ☐ *NO* *By Whom?* _____

LOCATION OF WORK SHOWN ON ATTACHED SITE PLANS? ☐ *YES* ☐ *NO* *Purpose:* _____

DATE(S) CORING OR SAWCUTTING WILL TAKE PLACE: Signed: _____

UC DAVIS HEALTH USE ONLY

DATE RECEIVED:

WHO FROM UNIVERSITY WILL AUTHORIZE, SUPERVISE AND VERIFY?
PHONE:

Utilities Verified by IOR? ☐ *YES* ☐ *NO*

Activities coordinated with: ☐ PO&M ☐ Fire ☐ Telecom ☐ Occ. Safety ☐ Other (Itemize):

COMMENTS:

DATE AUTHORIZED: _____ Signed: _____ University Representative
PO&M: _____

COMPLETION DATE: _____

COMMENTS:
(Unknown Utilities Encountered, Disruptions, Successes, Weather, etc.)

SIGNED: _____

Copies to: University Consultants, PO&M, Fire, Telecom, File, Others:

SECTION 01 74 00

CLEANING

PART I - GENERAL

1.01 SECTION INCLUDES

A. Construction Cleaning.

B. Requirements for cleaning during progress of Work, at Substantial Completion of Work and at Acceptance of Work.

C. Disposal of waste materials, debris and rubbish during construction.

1.02 RELATED SECTIONS

A. General Conditions of the Contract: Cleanup.

B. Additional Requirements: Cleaning for specific products or elements of Work are described in Specification Sections describing that Work.

C. Section 015610 Airborne Contaminants Control have procedures and practices that shall be implemented and followed by the Contractor for this project.

PART II - PRODUCTS

2.01 MATERIALS

A. Use only those cleaning agents and materials that will not create hazards to health or property and that will not damage surfaces.

B. Use only those cleaning agents, materials and methods recommended by manufacturer of the material to be cleaned.

C. Use cleaning materials only on surfaces recommended by cleaning agent manufacturer.

2.02 EQUIPMENT

A. Provide covered containers for deposit of waste materials, debris, and rubbish.

B. Provide at each entry point to the Work, and at other areas as directed by University's Representative, a clean room sticky mat. Replace mats daily or as requested by University Representative.

PART III - EXECUTION

3.01 CLEANING

A. Construction Cleaning: During Construction, maintain buildings, premises and property free from waste materials and rubbish. Dispose of such waste and debris at reasonable intervals off of University property.

1. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.

2. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to closing such spaces.

    a. All horizontal surfaces above ceilings shall be cleaned prior to ceiling closer.

3. After every concrete placement clean all wet concrete from all surfaces.

    a. Interior and exterior

4. Clean interior areas daily to provide suitable conditions for Work. Remove debris from areas of work on a daily basis at a minimum, or more often as required to provide suitable conditions for work.

5. Broom clean with sweeping compound or HEPA Vacuum interior areas prior to start of surface finishing, and continue cleaning on an as needed basis.

6. Control cleaning operations so that dust and other particles will not adhere to wet or newly coated surfaces.

7. Provide a mat, as specified above, for project entrances and exits. Item to be of sufficient size to allow personnel exiting project site to clean debris and dust from shoes. Tracking dust and debris through working areas of hospital and/or related buildings is not acceptable.

8. Any dust or debris tracked out of the construction site, either by foot traffic or by debris hauling vehicles shall be cleaned by the contractor. If the dirt or other debris is determined by the University’s Representative to from the contractor’s activities at the jobsite it shall be cleaned in a timely manner regardless of how far from the site it is.

B. Conduct cleaning and disposal operations in compliance with Waste Management Program per 013900 and all applicable codes, ordinances, regulations, including anti-pollution laws.

3.02 SUBSTANTIAL COMPLETION CLEANING

A. Execute a thorough cleaning prior to Substantial Completion review by University's Representative.

B. At roof areas remove all unused materials and construction waste including but not limited to screws, nails, fasteners, sheet metal cuttings, scrapes, oil, grease and adhesive. Wash down roof horizontal and vertical surfaces. Clean out all debris at roof drains.

C. Clean walkways, driveways and streets by thorough brooming and wash-down.

D. Clear debris from storm drainage lines and ways, leaving site ready for stormy weather.

E. Rake landscaped areas clean.

F. Remove waste and surplus materials, rubbish and temporary construction facilities, utilities and controls.

G. Disinfect containment and protection areas as directed by University Representative.

H. For Airborne Contamination areas: Construction cleaning use wet cleaning methods and HEPA-filtered vacuum cleaners are required to minimize release of airborne contaminants. Contain waste materials, debris and rubbish.

3.03 FINAL COMPLETION CLEANING

A. Complete final cleaning before submitting final Application for Payment.

B. Employ professional building cleaners to thoroughly clean building immediately prior to final inspection.

C. Remove the following but not limited to concrete splatters, paint splatters, pencil marks, pen marks, chalkline marks, tape, protective films & coatings, grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from all sight-exposed interior and exterior surfaces.

D. Restore damaged or marred surfaces.

E. Remove dust from all horizontal surfaces not exposed to view, including light fixtures, ledges and fixture lenses.

F. Clean and polish all glass, mirrors, and bright metal work. Clean and disinfect all plumbing fixtures.

G. Damp wash all resilient flooring. Waxing of resilient flooring shall be done by the University.

H. Thoroughly sweep all floors and vacuum all carpets.

I. Cleaning of Work provided by University under separate contracts, will not be required except if soiled by construction activities under this Contract.

J. Thoroughly clean and polish all resilient flooring, metal and plastic surfaces; remove labels and protective coatings.

K. Replace filters and clean heating and ventilating equipment used for temporary heat and ventilation.

L. Remove waste material or equipment that has been damaged, touch up and /or repair exposed areas; such repairs to be approved by University's Representative.

M. Should final cleaning be inadequate, as determined by University's Representative, and Contractor fails to correct conditions, University's Representative may order thorough cleaning and deduct the cost from Final Payment.

3.04 FINAL COMPLETION SITE CLEANING

A. Broom clean exterior paved surfaces. Rake clean other surfaces of the grounds.

B. Power Wash, Hose down and scrub where necessary all concrete and walks dirtied as a result of the construction work. Thoroughly remove mortar droppings from all walks and pavements.

C. Remove from the site all tools, equipment, construction waste, unused materials, excess earth, and all debris resulting from the Work.

3.05 DISPOSAL

A. Conduct cleaning and disposal operations in compliance with all applicable codes, ordinances, regulations, including anti-pollution laws.

B. Do not bury or burn rubbish or waste material on University premises.

C. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.

D. Remove waste materials, debris, and rubbish from site and dispose of off-site.

3.06 INSPECTION

A. Prior to Beneficial Occupancy, Substantial Completion or Final Completion; Contractor and University's Representative shall jointly conduct an inspection of sight-exposed interior and exterior surfaces to verify that entire Work is clean.

END OF SECTION 01 74 00

SECTION 01 76 00

PROTECTION of EXISTING and INSTALLED CONSTRUCTION

PART I - GENERAL

1.01 SECTION INCLUDES

A. Protection for Products Including University Provided Products, After Installation.

B. Protection of Existing Utilities, Interference and Underground Structures.

C. Protection of Existing Structures and Work adjacent to new construction and demolition.

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

1.03 EXISTING UTILITIES

A. Known Utilities: Known existing utilities are shown on Contract Drawings in approximate locations. **Contractor** shall exercise care in avoiding damage to existing facilities. **Contractor** shall be responsible for repair of same if damaged through **Contractor**'s action. Hand excavation shall be utilized when digging in close proximity to existing utilities. University does not guarantee that all utilities or obstructions are shown, or that locations indicated are accurate.

B. As part of the Contract Work the investigation and excavation to locate existing utilities and underground structures shall be as follows, Contractor shall assume the existing known utility is within a 5 feet zone on either side of the location indicated on the Contract Documents. If the existing known utility is not located within a 5 feet zone on either side of the location indicated on the Contract Documents, the Contractor shall immediately notify the Universities Representative. The Contractor shall continue excavating until the existing utility is located. The Contractor shall be compensated for any additional excavation beyond the 5 feet zone on either side of the existing utility per 1.03D.

C. Electrical Equipment: No work shall be performed on energized electrical equipment unless scheduled with University's Representative. University reserves right to specify specific conditions for all work involving energized high voltage electrical equipment and its scheduled modification proposal.

D. Uncovering Facilities: Prior to any earthwork for new construction, **Contractor** shall uncover all existing piping where crossings, interferences or connections are shown on Contract Drawings, from one (1) foot below proposed construction limit to the existing ground surface. Any variation in actual elevations and indicated elevations shall be brought to University's Representative attention. If **Contractor** does not expose all existing utilities, **Contractor** shall not be entitled to additional compensation for work necessary to avoid unknown interferences.

E. Interferences: If interferences occur at locations other than general locations shown on Contract Drawings, and such utilities are damaged before such locations have been established, or create an interference, **Contractor** shall immediately notify University's Representative and a method for correcting said interference shall be supplied by University. Payment for additional work due to interferences not shown on Contract Drawings shall be in accordance with the General Conditions of the Contract. Cost of repair to damaged utilities shall be deducted from the Contract Sum.

F. Accuracy of Drawings: Drawings showing location of equipment, piping, etc. are diagrammatic and job conditions will not always permit installations in locations shown. When a conflict situation occurs, immediately bring to attention of University's Representative for determination of relocation.

G. Deviations from Drawings: Information shown relative to existing power and signal service is based upon available records and data but shall be regarded as approximate only. Minor deviations found necessary to conform with actual locations and conditions shall be made at no change to the Contract Sum.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 PROTECTION AFTER INSTALLATION

A. Installed Equipment and Materials: Adequately protect all installed equipment and materials until completion and acceptance by University's Representative.

B. Existing Facilities: All existing areas, improvements and facilities shall be protected from damage of any type resulting from operations, equipment or workers of **Contractor** during the construction process.

C. Subsequent Operations: Protect installed products and control traffic in immediate area to prevent damage from subsequent operations.

D. Traffic Areas: Provide protective coverings at walls, projections, corners, and jambs, sills, and soffits of openings in and adjacent to traffic areas.

E. Elevators: Cover walls and floors of elevator cabs, and jambs of cab doors, when elevators are used by construction personnel. Protect the elevator call buttons, switches, communication devices, lights, thresholds and other components.

F. Moisture and Humidity Protection: Protect all new installed work and existing work per the manufacturer’s requirements from moisture or humidity damage including but not limited

to stored materials, finishes, gypsum board, insulation, doors, casework, millwork, equipment and all other building components.

G. Finished Floors: Protect finished floors and stairs from dirt, wear, and damage:

1. Secure heavy sheet goods or similar protective materials in place, in areas subject to foot traffic.

2. At all transitions to adjacent areas not under construction.

3. Lay rigid materials in place in areas subject to movement of heavy objects and where storage of products will occur.

H. Waterproofed and Roofed Surfaces:

1. Restrict use of surfaces for traffic of any kind, and for storage of products.

2. When an activity is mandatory, obtain recommendations for protection of surfaces from manufacturer. Install protection and remove on completion of activity. Restrict use of adjacent unprotected areas.

3. No Construction work shall be conducted on any unprotected roof weather new or existing.

4. All pathways to work on the roof shall be protected.

I. Lawns and Landscaping: Restrict traffic of any kind across planted lawn and landscaped areas.

J. Adjacent Facilities: Care shall be exercised to prevent damage to adjacent facilities including walks, curbs, and gutters. Adequate protection shall be placed where equipment will pass over such obstructions, and facilities damaged by construction operations shall be removed and replaced at **Contractor**'s expense.

3.02 Protection of Existing Structure and Work adjacent to new construction and demolition.

A. The **Contractor** shall protect existing in place work at the exterior and interior, including but not limited to finishes, materials, products, utilities, fixtures, and equipment adjacent to new construction and demolition. Any existing in place work at the exterior and interior that is damaged by the **Contractor** shall be repaired or replaced at no extra cost to the University.

B. Overloading: Contractor shall be responsible for overloading any part or parts of structures beyond the calculated capacities of the design. Placing materials, equipment, tools,

machinery, or any other item shall be done with care to avoid overloading. No loads shall be placed on floors or roofs before they have attained their permanent and safe strength.

C. Damaged Work: All damaged work shall be replaced, repaired, and restored to its original condition without change to the Contract Sum. Repair or replace all damaged work promptly as directed by University's Representative.

D. Damaged Utilities: Where existing utilities are damaged or disrupted on account of any act, omission, neglect, or misconduct of the **Contractor** in the manner or method of executing the Work, or due to non-execution of work, such damage shall be immediately repaired to maintain operation regardless of the time of occurrence.

E. Temporary Construction: Provide temporary construction necessary for protection of building and its parts. Close in buildings as soon as possible to protect from weather and vandalism. Protect existing buildings and controlled temperature areas from damage.

F. Doors and Casework: Protect doors, millwork and mill counters and cases and hardware from damage, including abrading and scratching of finishes. Protect doors and frames and hardware from mechanical damage and damage to anodic coatings.

G. Protective Coatings: Remove protective coatings, etc., as required to leave work in condition for painting and finishing, final cleaning, etc.

H. Exterior Work: Protect all exterior work, including existing asphalt paving and landscaping and buildings.

END OF SECTION 01 76 00

SECTION 01 77 00

CLOSEOUT PROCEDURES

PART I - GENERAL

1.01 SECTION INCLUDES

A. Project Closeout Procedures

B. Contract Closeout Procedures

C. Punch List of Incomplete Work or Corrections

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES: Administrative general requirements for submittals.

C. Section 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS: Removal of Controls.

D. Section 017400 – CLEANING: Final Cleaning.

E. Section 017800 – CLOSEOUT SUBMITTALS

1.03 FINAL COMPLETION ACTIONS

A. On Application for Payment that coincides with date Substantial Completion is claimed, show 100% completion for portion of Work claimed substantially complete.

B. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications and similar documents.

C. Notify the University's Representative fourteen (14) calendar days prior to the Project being ready for permanent cores and keying.

D. Complete start-up testing and Commissioning of systems, and instruction of University personnel. Remove temporary facilities from site, along with construction tools, mock-ups, and similar elements.

1.04 SUBSTANTIAL COMPLETION REVIEW

A. Preliminary Punch List Review:

1. **Contractor** shall provide an electronic file as indicated in Item 1.04, C., (Preliminary Punch List) of items not installed, to be completed, not functioning correctly or to be corrected. The list shall include the anticipated dates of when the work is to be installed, completed or corrected.

2. Organize the List per Item 1.04, C.

3. List shall identify items by location (e.g., room number and name) and consecutive number (e.g., 307-5 might identify item 5 in room 307, Roof-4 would identify item 4 on Roof).

4. Segregate architectural, plumbing, HVAC and electrical Work on separate lists.

5. University's Representative and **Contractor** shall conduct a brief walk-through of Project to review scope and adequacy of list.

B. **Contractor**'s Certification: When determined by **Contractor** that Work is substantially complete, **Contractor** shall notify University's Consultant and University's Representative.

1. Submit to University's Representative written certification that:

a. Contract Documents have been reviewed.

b. All portions of Work have been carefully inspected.

c. Work is complete in accordance with Contract Documents.

d. Equipment and systems have been commissioned, tested, adjusted and balanced and are fully operational.

e. Indicate Operation of systems that have been demonstrated to University personnel and which systems have not been demonstrated to University personal.

f. Work is ready for University's Consultant's Substantial Completion review.

2. Provide minimum fourteen (14) calendar days' notice to University's Representative prior to desired date for Punch List review.

C. Organization of List (Punch List):

1. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by **Contractor** that are outside the limits of construction.

2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.

3. Format Requirements: Provide the following:

a. Organized electronic file that is able to be filtered or queried by the following categories:

1) Contractor or Subcontractor

2) Building Area/Floor if applicable

3) Room Number or specific interior or exterior area.

4) Photo Number if applicable

5) Open or Closed

6) Columns for use by University’s Representative

a) Responsible Design Consultant

7) Comments

b. Other Punchlist Software may be used if approved by the University’s Representative.

c. Include the following information at the top of each page:

1) Project name and Number.
2) Date.
3) Name of University's Representative.
4) Name of **Contractor**.
5) Page number.

D. Punch List Review: University's Representative and University's Consultants as may be required, will attend a Contract closeout review and conduct a walk-through of Project to review **Contractor**'s list of items to be completed and corrected (Punch List). **Contractor** and University's Consultant shall note deficiencies, if any.

1. **Contractor** shall prepare list and record additional items as University's Representative may determine require completion and correction from walk-through.

a. If deficiencies are noted University's Representative and University's Consultant shall promptly notify **Contractor** in writing, listing observed deficiencies.

b. If no deficiencies are noted, or when noted deficiencies are removed from the Punch List, University's Representative shall promptly notify **Contractor**.

2. **Contractor** shall edit the electronic file and distribute list with University's Representative and University's Consultant's additions.

3. **Contractor** shall remedy deficiencies.

4. Costs of additional visits to site by University's Consultants to review completion and correction of Work shall be deducted from the Contract Sum.

E. Uncorrected Work: Refer to requirements specified in SECTION 014500 – QUALITY CONTROL regarding Contract adjustments for non-conforming work.

F. Cleaning and Clearing: Prior to Substantial Completion review, execute cleaning and clearing site of temporary facilities and controls, as specified in SECTION 015600 – TEMPORARY BARRIERS, ENCLOSURES AND CONTROLS and SECTION 017400 CLEANING

G. Testing and Inspection: Prior to Substantial Completion review, complete all tests and inspections and submit applicable reports and approvals. Provide commissioning of building systems per Section 013900 GREEN BUILDING POLICY IMPLEMENTATION.

1. Complete materials tests and inspections.

2. Complete commissioning, testing, inspection, balancing, sterilization and cleaning of plumbing and HVAC systems.

3. Complete commissioning, testing and inspection of electrical system.

4. Complete commissioning and operational tests of equipment.

5. IF HCAI PROJECT: Submit electronic file of **Contractor**'s Final HCAI Verified Reports to University's Representative certifying completion of the Work in conformance with the Contract Documents. Report forms will be supplied by University's Representative.

H. Acceptance of the Work shall not relieve **Contractor** of any responsibility for defects that develop during the guarantee period and are caused by **Contractor**'s failure to perform work in accordance with requirements of Contract Documents.

1.05 FINAL COMPLETION SUBMITALS (See 017800 CLOSEOUT SUBMITTALS)

1.06 STATEMENT OF ADJUSTMENT OF ACCOUNTS

A. Submit final statement reflecting adjustments to Contract Sum indicating:

1. Original Contract Sum
2. Previous Change Orders
3. Changes under allowances (Mark as NOT USED if not project applicable.)
4. Changes under unit prices (Mark as NOT USED if not project applicable.)
5. Deductions for uncorrected work
6. Penalties
7. Deductions for liquidated damages
8. Deductions for re-inspection fees
9. Other adjustments to Contract Sum
10. Total Contract Sum as adjusted
11. Previous payments
12. Sum remaining due

B. University will issue a final Change Order reflecting approved adjustments to Contract Sum not previously made by Change Order.

1.07 APPLICATION FOR FINAL PAYMENT

A. Final Payment: After completion of all items listed for completion and correction, after submission of all documents and products, and after final cleaning, submit final Application for Payment, identifying total adjusted Contract Sum, previous payments and sum remaining due. Refer to SECTION 012900 – MEASUREMENT AND PAYMENT and the General Conditions of the Contract.

B. Submit As-Built Documents to University's Representative with final Application for Payment.

PART II - PRODUCTS – Not Applicable to this Section

PART III - PART III - EXECUTION

3.01 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.

1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.

2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.

a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.

3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use.

3.02 REPAIR PERIOD (GUARANTEE OR WARRANTY PERIOD)

A. Upon acceptance of the project or a portion thereof from the **Contractor**, the "Guarantee to Repair Period" of one year or more will begin as described in Article 9 of the General Conditions. The University Representative will become responsible for receiving notices of Defective Work from building occupants and securing **Contractor** compliance where applicable. The University Representative shall have prime responsibility for follow-up & monitoring of **Contractor** activities. (Refer to Article 12 of General Conditions).

1. If the **Contractor** must "Shut-down" the fire and security alarms in an occupied building, then the **Contractor** shall be responsible to provide a fire and security watch until the system, at no additional cost to the University.

END OF SECTION 01 77 00

SECTION 01 78 00

CLOSEOUT SUBMITTALS

PART I - GENERAL

1.01 SECTION INCLUDES

A. Equipment Data

B. Operation and Maintenance Instructions

C. Instruction of University personnel

D. Schedule of Submittals

E. Spare Parts and Maintenance Materials

F. Guarantees, Warranties, Bonds, Service and Maintenance Contracts

G. Project As-built Documents

1.02 RELATED SECTIONS

A. Section 013100 – COORDINATION

B. Section 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

C. Administrative general requirements for submittals.

D. Section 013900 – GREEN BUILDING POLICY IMPLEMENTATION

E. Section 014500 – QUALITY CONTROL: Manufacturer's tests and inspections as a condition of warranty.

F. Section 014550 – INSPECTION AND TESTING OF WORK

G. Section 016100 – PRODUCT REQUIREMENTS

H. Section 017700 – CLOSEOUT PROCEDURES

1.03 FILE FORMATS

A. All printed documents submitted per this section shall be in PDF format

1. The PDF files will be unlocked and searchable.
2. All PDF documents will be bookmarked.
3. The exception to electronic format for As-Built drawings will be noted in the specific specification section where they are required.

B. Digital Photography

1. All files will be submitted in JPEG

1.04 EQUIPMENT DATA AND OPERATION AND MAINTENANCE (O&M) INSTRUCTIONS

A. Preparation of data shall be done by persons:

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of this Section.
3. Skilled in technical writing to extent required for communication of essential data.
4. Skilled as drafters competent to prepare required drawings

B. O&M Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at time of Section Submittals. Submit reviewed manual content formatted and organized as required by this Section. Prepare in the form of a data and instructional manual.

C. Submit PDF electronic files of operation and maintenance manuals. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to the University. The exception to electronic format will be indicated in the specific specification section requiring hard copies of the manual.

1. Name each indexed document file in composite electronic index with applicable item name. Include a completed electronically linked operation and maintenance directory.

a. List Project title and Project number and particular building as applicable.

b. Enable inserted reviewer comments on draft submittals.

2. Organization: Arrange content by systems under Section numbers and sequence in accordance with the Project Specifications Table of Contents.

D. Table of Contents, Each Volume: Provide title of Project, Project number, with names, addresses, and telephone numbers of University's Representative, as applicable, and **Contractor**, including name of contact person. Provide schedule of products and systems, indexed to content of the volume.

1. For each Product or System: List names addresses and telephone numbers of subcontractor, original supplier and manufacturer, as applicable, including name of contact person. Include name and address of local source of supplies and replacement parts.
2. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete information not applicable.
3. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project As-Builts Documents as maintenance drawings.
4. Additional Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in SECTION 014500 – QUALITY CONTROL.
5. Warranties and Bonds: Include in each applicable section.

E. Manual for Materials and Finishes:

1. Building Products, applied Materials, and Finishes: Provide PDF composite electronically indexed file. Include product data, with catalog number, size, composition, and color and texture designations. Provide information for re-ordering custom manufactured Products.
2. Instruction 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.
3. 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.
4. Additional Requirements: As specified in individual Specification Sections.
5. Table of Contents: Provide PDF electronic file with links to individual sections.

F. Manual for Equipment and Systems

1. Record Instructions: Forward to University's Representative, upon completion of work, and before work will be considered for acceptance, complete PDF composite electronically indexed file of instructions of entire plant and component parts, including manufacturer's certificates, warranty slips, parts lists, descriptive brochures, and maintenance and operating instructions, in quantities set forth in various Divisions. Submit drafts for review before preparing final PDF electronic file.
2. O & M Instructions: Provide and install, where directed, printed sheet under clear plastic cover, giving concise operating and maintenance instruction for equipment.
3. Each Item of Equipment and Each System: Inclusive description of unit or system, Model Number, Serial Number, and component parts. Identify function, normal characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts. Best to include all information provided in final approved equipment submittal. Design drawing shall be updated to reflect what was actually provided.
4. Panelboard Circuit Directories: Provide electrical service characteristics, controls and communications.
5. Wiring Diagrams: Include color-coded wiring diagrams as installed.
6. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and any special operating instructions.
7. Maintenance Requirements: Include routine procedures and guide for troubleshooting; disassembly, repair, and re-assembly instructions; and alignment, adjusting, balancing, and checking instructions. Provide servicing and lubrication schedules, and list of lubricants required.
8. Instructions: Include manufacturer's printed operation and maintenance instructions. Include sequence of operation by controls manufacturer.
9. Parts Data: Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance. Provide list of original

manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

10. Control Data: Provide as installed control diagrams by controls manufacturer.

11. Piping Data: Provide Contractor's coordination drawings, with color piping diagrams as installed. Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

12. Design Data: Provide a listing in table of Contents for design data, with tabbed binder divider page and space for insertion of data.

13. Reports: Include test and balancing reports as specified.

14. Additional Requirements: As specified in individual Specification Sections.

G. Instruction of University's Personnel: Instruct University designated personnel to their full and complete understanding, procedures necessary to operate and maintain equipment and systems on continuing basis. Provide training of staff.

1. Schedule: Before final inspection, instruct University designated personnel in operation, adjustment, and maintenance of products, equipment, and systems, at agreed upon times. For equipment requiring seasonal operation, perform instructions for other seasons within six (6) months of completion.

2. Basis of Information: Use operation and maintenance manuals as basis for instruction. Review contents of manual with personnel in detail to explain all aspects of operation and maintenance.

3. Instructional Material: Prepare and insert additional data in the manual when need for such data becomes apparent during instruction.

H. Equipment Data and Operation and Maintenance Instructions Submittals:

1. Submittals: Comply with administrative requirements specified in SECTION 013300 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

2. Preliminary Draft O&M Submittal: Submit electronic files of each manual at least **[180]** calendar days before commencing demonstration and training. University's Representative will review draft and return with comments.

   a. The comments or corrections shall be incorporated into the Final O&M submittal.

   b. Correct or revise each manual to comply with the University’s Representatives comments. Submit electronic copies of each corrected manual within **[15]** calendar days of receipt of University’s Representative’s comments.

   c. University’s Representative will notify the **Contractor** when the edits have been accepted for incorporation into the final O&M submittal.

3. Advance Submittals: For equipment, or component parts of equipment to be put into service during construction and operated by University, submit documents within ten (10) calendar days after equipment approval.

4. Final O&M Submittal: After completion of instruction of University operation and maintenance personnel and final inspection, revise content of documents to include additional information deemed necessary from instruction experience of University's personnel and any changes made during construction. Submit each

manual in the final form prior to requesting inspection for Substantial Completion. The University's Representative will return comments electronically.

a. Submit electronic copies of each manual prior to requesting training.

1.05 SPARE PARTS, EXTRA STOCK AND MAINTENANCE MATERIALS

A. Products Required: Where called for in Contract Specifications, deliver to University's Representative, materials, etc., for use in maintenance work. Provide list of materials delivered to University's Representative, indicating date and acceptance by University's Representative.

1. Provide quantities of products, spare parts, maintenance tools, and maintenance materials specified in individual Sections to be provided to University's Representative, in addition to that required for completion of the Work.

2. Products supplied shall be identical to those installed in the Work. Include quantities in original purchase from supplier to avoid variations in manufacture.

3. Provide itemized list of all spare parts, materials and transmittal to the University's Representative for acceptance.

B. Storage, maintenance: Store products with products to be installed in the Work, as specified in SECTION 016100 – PRODUCT REQUIREMENTS: Product Storage and Protection.

C. Delivery to site: Prior to final payment, deliver and unload spare products to project site. Coordinate with University's Representative and obtain receipt. University will handle and store products.

1.06 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:

1. List of Documents: Include a table of contents for each O&M and emergency, operations listed per CSI Specification number.

2. List of Systems and Subsystems: Include references to operation and maintenance manuals that contain information about each system.

3. List of Equipment: List equipment for each system, organized by system. For pieces of equipment not part of system, list separately.

4. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists,

assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

5. This Directory shall be submitted to the University's Representative for review and acceptance.

1.07 MAINTENANCE AGREEMENTS

A. Prior to Closeout all Maintenance Agreements required by the Contract Documents shall be assembled and submitted electronically with the Closeout Submittal Requirements.

1. Provide all Maintenance Agreements in PDF form.

a. Submit individual files for each Maintenance Agreement with a directory assembled by CSI division.

1) Combine all project Maintenance Agreements including the directory into one PDF for record.

2) Files will be formatted for printing with a footer identifying the CSI number and UC Davis Health project number.

3) There will be a front cover to the file that contains all project information including the **Contractor** contact information.

1.08 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of University's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.09 WARRANTIES AND GUARANTEES

A. Warranties and Guarantees, general: Guarantees from subcontractors shall not limit **Contractor**'s warranties and guarantees. Whenever possible, **Contractor** shall cause warranties of subcontractors to be made directly to University. If such warranties are made to **Contractor**, **Contractor** shall assign such warranties to University prior to final payment. When equipment and products, or components thereof, bear a manufacturer's warranty or guarantee that extends the time period of **Contractor**'s warranty or guarantee, so state in the warranty or guarantee.

1. Standard Product Warranties: Preprinted written warranties published by individual manufacturers for particular products and specifically endorsed by manufacturer to University.
2. Special Warranties: Written warranties required by or incorporated in Contract Documents, to extend time limits provided by standard warranties or to provide greater rights for University.
3. Provisions for Special Warranties: Refer to General Conditions of the Contract for terms of **Contractor**'s special warranty of workmanship and materials.
4. Specific Warranty Requirements: requirements are included in the individual Sections of Division 2 through 49 of the Contract Specifications, including content and limitations.
5. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve **Contractor** of warranty on work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractor’s requirement to countersign special warranties with **Contractor**.
6. Related Damages and Losses: When correcting warranted work that has failed, remove and replace other work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted work.
7. Reinstatement of Warranty: When work covered by a warranty has failed and been corrected, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to original warranty with an equitable adjustment for depreciation.
8. Replacement Cost: On determination that work covered by a warranty has failed, replace or rebuild the work to an acceptable condition complying with requirements of Contract Documents. **Contractor** shall be responsible for cost of replacing or rebuilding defective work regardless of whether University has benefited from use of the work through part of its useful service life.

9. University Recourse: Written warranties made to the University are in addition to implied warranties, and shall not limit duties, obligations, right and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which University can enforce such other duties, obligations, rights, or remedies.

10. Rejection of Warranties: University reserves right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

11. University reserves right to refuse to accept work where a special warranty, or similar commitment is required, until evidence is presented that entities required to countersign commitments are willing to do so.

12. When designated portion of Work is completed and occupied or used by separate agreement with **Contractor** during the construction period, submit properly executed warranties to University's Representative within fourteen (14) calendar days of completion of that designated portion of the Work.

13. Submit written guarantees, in the form contained at end of this Section.

B. Form of Warranty or Guarantee: All written warranties and guarantees, excepting manufacturers' standard printed warranties and guarantees, shall be submitted on **Contractor**'s, subcontractor's, material supplier's, or manufacturer's own letterhead, addressed to University. Warranties and guarantees shall be submitted in duplicate and complying with the form letter following. Warranty and guarantee letters shall be signed by all responsible parties and by **Contractor** in every case, with modifications only as approved by University to suit the conditions pertaining to the warranty or guarantee.

C. Submission requirements:

1. **Contractor** shall collect and assemble required warranties, guarantees, bonds, and service and maintenance contracts. Provide PDF electronically signed or signed and scanned copies of each. Organize documents into an orderly sequence based on the table of contents of the Project Manual CSI divisions.

2. Table of Contents: Provide PDF electric file with links to individual warranty sections. Include the following information.

a. Product or Work item.

b. Product or work suppliers firm name, address, telephone number and name of principal.

c. Scope of guarantee, bond, service or maintenance agreement.

d. Date of beginning of guarantee, bond, service or maintenance contract.

e. Duration of guarantee, bond, service or maintenance contract.

f. **Contractor**'s name, address, telephone number and name of principal.

g. Provide information for University personnel:

1) Proper procedure in case of failure.

2) Circumstances that might affect validity of guarantee or bond.

D. Warranty Submittal

1. Provide all warranties in PDF composite electronically indexed files.

a. Submit individual files for each warranty with a directory assembled by CSI division.

1) Combine all project warranties including the directory into one PDF for record

2) Files will be formatted for printing with a footer identifying the CSI Number and UC Davis Health Project Number.

3) There will be a front cover to the file that contains the title “WARRANTY, GUARANTEE AND BOND” as well as all project information including the **Contractor** contact information. Title of Project and UC Davis Health Project Name and Number.

4) Coordinate copies of each warranty to be included in operation and maintenance manuals.

5) Final Submittal shall be incorporated into one PDF, bookmarked and searchable document.

F. Time of Submittals: Submit **[60]** calendar days prior to request for final payment. When work activity is delayed materially beyond date of Substantial Completion, provide updated submittal within ten (10) calendar days after Final Completion, listing date of Final Completion as the start of the Guarantee period.

1.10 AS-BUILT DOCUMENTS

A. Definitions:

1. The terms “As-Built Documents” or “As-builts” shall mean the marked-up version of the Contract Documents prepared by **Contractor** to record as-built conditions, changes, and selections made during construction.

B. Preparation of data shall be done by person(s):

1. Trained and experienced in the maintenance, preparation, and submittal of As-Built Documentation.

2. Familiar with requirements of this Section.

C. As-built Documents Content:

1. As-built Drawings and Specifications
2. As-built Schedule
3. Miscellaneous As-Built Submittals

D. As-Built Drawings and Specifications: Provide a complete set of As-Built Drawings and Specifications, showing and noting every change from the Contract Set, including but not limited to:

- Changes made in response to RFI's
- Amended Construction Documents (ACD) and related RFI's
- Change Orders/Field Orders and related RFI's.
- Architect's Supplemental Information (ASI) and related RFI's.
- Changes to locations, including access panels, windows, doors, plumbing, etc.
- Changes caused by obstructions and the obstructions notated
- Changes made in response to inspections
- Final dimensions
- Deferred Submittals (see "Miscellaneous As-Built Submittals" below)
- Shop Drawings (see "Miscellaneous As-Built Submittals" below)
- Final product selections

1. Format Requirements:

a. Provide in PDF format with bookmarks. All annotations shall be neat and legible.

b. File naming conventions:

1) Drawings: YY_MMDD_University's Project Number_As-Built_Dwgs

2) Specifications: YY_MMDD_University's Project Number_As-Built_Spec

c. Provide text (preferably 1/4" or larger) on each drawing and on the cover of the specifications indicating the submission date, the University's Project Number, and the term "As-Builts". The text shall be the same size and general location on all sheets of the drawings and care should be taken to locate the text in a place as to not obscure text or linework on the drawings.

d. Bookmarks: Provide bookmarks in the following format:

1) Drawings: Sheet Number – Sheet Name. Do not add additional categories or disciplines.
2) Specifications: The first page of each section shall be bookmarked with: Section Number – Section Name.
   - Exception: If a hyperlinked Table of Contents is provided the bookmarks may be excluded.

e. Supplemental sheets: When adding a supplemental sheet containing sketches or other information that describe changes to

the Contract Documents:

1) Provide a two-digit numerical suffix that starts with .01 and ascends for every supplemental sheet:
Example: If the supplemental sheet contains sketches that describe changes to the hypothetical sheet “A1-01” the first supplemental sheet will be numbered “A1-01.01”.

2) The sheet name and number are to be similar in text size and location to the sheet being supplemented.

3) Include supplemental sheets in bookmarks.

E. As-Built Schedule: Provide As-Built schedule per SECTION 013200 CONTRACT SCHEDULES

1. Format Requirements:

a. Schedule to be in PDF format.
b. File naming conventions:

1) YY_MMDD_ University’s Project Number_As-Built_Schedule

F. As-Built Shop drawings:

1. Format Requirements:

a. File naming convention for shop drawings:
1) YY_MMDD_ University’s Project Number_ShopDwg_Spec Section Number

G. As-built Documents Submittal: Submit all As-Built Documents together after Final Completion and in accordance with SECTION 017700 CLOSEOUT PROCEDURES. Allow 10 business days for initial review and for each resubmittal.

1.11 AS-BUILT PRODUCT DATA

EDIT NOTE: PM to verify product data is required as part of close out submittal in addition to submittals collected during construction

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.

1. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

2. Format: Submit Product Data as annotated PDF electronic file Include As-Built Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

1.12 AS-BUILT PRODUCT SAMPLES

EDIT NOTE: PM to verify physical samples are required as part of close out submittal. PM to make storage arrangements if physical samples are to be submitted.

A. Preparation: Mark Samples to identify the material and location or use on project; indicate finish designations of materials and products, where designations are indicated on Drawings. Cross-reference Samples with corresponding Product Data submitted.

1. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.

1. Note related Change Orders, As-Built Specifications, and As-Built Drawings where applicable.

2. Format: Submit As-Built Samples in same size and format as indicated for each sample in the specification's sections. Pack samples securely, with protective wrapping. Include As-Built Samples directory organized by Specification Section number and title.

3. Each Sample will be labeled with Manufacturer, Model, Product Number, CSI Section and UC Davis Health Project Name and Number.

1.13 PHOTOGRAPHS

A. General: Prior to Closeout all photographic documentation required per 013220 Construction Progress Reporting shall be assembled and submitted with the Closeout Submittal Requirements.

1.14 CONSENT OF SURETY AND FINAL CERTIFICATES

A. General: Prior to closeout Consent of Surety and Final Certificates required by the Contract Documents shall be assembled and submitted with the Closeout Submittal Requirements.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 Refer to the following attachments

A. Guarantee

B. Report of Work Required by Warranty

END OF SECTION 017800

GUARANTEE

Project Title: _____

Project Location: _____

Project Number: _____ DATE: _____

GUARANTEE FOR _____ (the "Contract"),
(Specification SECTION and Contract No.)
between The Regents of the University of California ("University") and

_____ ("**Contractor**").
(Name of **Contractor** or Subcontractor)

hereby guarantees to University that the portion of the Work described as follows:

_____

_____

_____

_____

which it has provided for the above referenced Project, is of good quality; free from defects; free from any liens, claims, and security interests; and has been completed in accordance with Specification SECTION _____ and the other requirements of the Contract.

The undersigned further agrees that, if at any time within months after the date of the guarantee the undersigned receives notice from University that the aforesaid portion of the Work is unsatisfactory, faulty, deficient, incomplete, or not in conformance with the requirements of the Contract, the undersigned will, within 10 days after receipt of such notice, correct, repair, or replace such portion of the Work, together with any other parts of the Work and any other property which is damaged or destroyed as a result of such defective portion of the Work or the correction, repair, or replacement thereof; and that it shall diligently and continuously prosecute such correction, repair, or replacement to completion.

In the event the undersigned fails to commence such correction, repair, or replacement within 10 days after such notice, or to diligently and continuously prosecute the same to completion, the undersigned, collectively and separately, do hereby authorize University to undertake such correction, repair, or replacement at the expense of the undersigned; and **Contractor** will pay to University promptly upon demand all costs and expenses incurred by University in connection therewith.

SUBCONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Classification & Number: _____

Address: _____

Telephone Number: _____

CONTRACTOR

Signed: _____ Title: _____

Typed Name: _____

Name of Firm: _____

Contractor License Classification & Number: _____

Address: _____

Telephone Number: _____

REPORT OF WORK REQUIRED BY WARRANTY

To:	Atosa Abedini, University Representative
From:	

On the date noted, the University identified the following work required under warranty:

Prepared by: _____ _____ _____
(Print Name) Signature Date

In accordance with the terms and conditions of the Contract, the **Contractor** has agreed that, if at any time within 12 months after the date of the guarantee the **Contractor** receives notice from University that the aforesaid portion of the Work is unsatisfactory, faulty, deficient, incomplete, or not in conformance with the requirements of the Contract, the **Contractor** will, within 10 days after receipt of such notice, correct, repair, or replace such portion of the Work, together with any other parts of the Work and any other property which is damaged or destroyed as a result of such defective portion of the Work or the correction, repair, or replacement thereof; and that it shall diligently and continuously prosecute such correction, repair, or replacement to completion.

Prompt notification to be provided by the University Representative to the appropriate **Contractor**.

SECTION 01 91 10

BUILDING ENVELOPE COMMISSIONING

PART I -GENERAL

1.01 SUMMARY

A. Building Envelope Commissioning is the overall building enclosure quality assurance process and requirements in addition to quality assurance procedures specified in individual Sections.

B. Perform and document Building Envelope Commissioning (BECx). This Section supplements but does not supersede specific testing requirements found elsewhere in the Contract Documents. Include below-grade and above-grade construction as follows:

1. Roof construction, including roofing system, insulation, skylights, hatches, and other roof penetrations.

2. Interconnection between materials, components, and systems including flashing, expansion joints, and sealants.

C. Related Sections:

1. Section 014100 REGULATORY REQUIREMENTS

2. Section 014500 QUALITY CONTROL

3. Section 017700 CLOSEOUT PROCEDURES

4. Section 017800 CLOSEOUT SUBMITTALS

5. Section 019110 BUILDING ENVELOPE COMMISSIONING

6. Division 05 – Section 05500

7. Division 07 – Sections 070150.19, 075416, 07500, 07600, 07920

8. Division 08 – Sections 08710, 08630

9. Division 09 - Section 09900

1.02 REFERENCE STANDARDS

A. ASHRAE Guideline 0-2005, ‘The Commissioning Process’

B. ASTM E2813-12, 'Standard Practice for Building Enclosure Commissioning'

C. National Institute of Building Sciences 'Building Enclosure Commissioning Process BECx', Guideline 3, latest edition.

1.03 QUALITY ASSURANCE

A. The University will employ the Building Envelope Commissioning Manager (BECx)

1. The BECx shall manage, coordinate and supervise the Building Envelope Commissioning activities including the following:

a. Coordinate submittals and requests for information with the University's Representative pertaining to this specification section.

b. Coordinate inspection and testing activities with the **Contractor**. Create a detailed testing plan which identifies when the various tests will be completed and actions to be taken if deficiencies are found.

c. Supervise the Building Envelope commissioning process and coordinate the commissioning activities with the **Contractor** and the University Representative. **Contractor** to assign a coordinator authorized as a representative of each trade in commissioning activities.

B. Coordination Meetings:

1. The BECX shall plan and conduct coordination meetings including, University Representative, **Contractor**, and other required parties as construction progresses.

a. A kick-off meeting shall be scheduled at least 30 calendar days prior to the start of foundation installation. The objectives of the meeting are to review the building enclosure commissioning work scope, to clarify team member roles and responsibilities, and to plan the commissioning activities for the entire duration of the project.

b. Subsequent meetings shall be scheduled every two weeks or as needed during the completion of the building enclosure. The objective of these meetings is to facilitate coordination of the Work and resolve conflicts and deficiencies before performance testing of the Mockup and the following construction.

1.04 SUBMITTALS

A. Building Envelope Commissioning Plan and Schedule: **Contractor** to provide a recommended schedule for commissioning activities and provide specific information on the date and duration of individual tests for all components that make up the building enclosure from below grade to the highest point on the building to the BECx for coordination with the Building Envelope Commissioning Plan. BECx shall review the schedule and make recommendations back to the **Contractor** for final insertion into the Project Schedule.

B. The **Contractor** to coordinate with submittal requirements within related specification section as it pertains to this section.

1.05 **Contractor's** RESPONSIBLITIES

A. Provide all materials, labor and documentation to execute the Building Envelope commissioning activities described in the Contract Documents.

B. Coordinate the commissioning work included herein and ensure that all trades execute their responsibilities according to the Contract Documents.

C. Include Building Envelope Commissioning and required testing and inspection activities in the contract schedule

D. Attend commissioning meetings and provide meeting notes of those meetings.

E. Building Envelope Commissioning Coordinator (BECC): The **Contractor** shall provide a Building Envelope Commissioning Coordinator. The BECX, the University's Representative and the BECC will comprise a commissioning management team. While the BECx leads the overall commissioning process, the BECC is responsible for managing the day-to-day performance of the specified commissioning work. The BECC is an employee of the **Contractor** who is regularly and frequently on site and shall be responsible for only the Building Envelope portion of all Cx activities. Qualifications for the BECC include experience and excellent abilities to schedule, coordinate and manage subcontractors. The following tasks are some of the critical items included in the BECC's scope of work:

1. Integrating the specified commissioning activities into the overall contract construction schedule, updating the schedule and providing three-week look-ahead schedules showing the upcoming commissioning related activities.

2. Providing all commissioning submittals to the University's Representative.

3. Coordinating University training and ensuring that training is provided in accordance with the commissioning specifications.

4. Ensuring that subcontractor and supplier reviews of the BECx provided procedures and forms are completed and submitted in accordance with the specifications. This includes providing written comments (even if no exception is taken) regarding issues pertaining to safety, equipment protection/warranty and appropriateness of the procedure for the systems as provided from all required testing.

5. Providing test reports and progress reports in accordance with the commissioning specifications.

6. Managing the Contractor's participation in the testing process in accordance with the commissioning specifications.

7. Managing the Contractor's participation in resolution of issues identified during commissioning.

8. Ensuring that subcontractors perform preliminary testing to verify readiness for final testing, submitting documented verification that systems will pass tests with acceptable results to the University's Representative and the BECx.

9. Coordinating repeat tests that fail due to Contract deficiencies until acceptable results are achieved and managing the reimbursement of the University's costs for repeated tests in accordance with the commissioning specifications.

1.06 PERFORMANCE REQUIREMENTS

F. Testing

1. Perform testing on the building during construction according to the approved Building Envelope Commissioning plan.

2. Provide for 8 hours of testing on the building as determined and directed by University's Representative.

3. Provide reports after each test, stating the results, and recommended re-testing if necessary.

4. Submit reports to University's Representative for review.

5. Do not proceed with re-testing until University's Representative has completed its review and stated so in writing.

G. In Place Testing:

1. **Contractor** can elect for any required testing or re-testing to be in place on the building only as accepted by the University Representative.

2. Coordinate in-place testing with the completion of exterior systems and prior to the closing-in of the interior of walls or ceilings related to the testing location to allow for results to be evaluated and any required correction of deficiencies complete within construction sequencing.

1.07 SYSTEMS PERFORMANCE TESTING

A. The required tests for the final in-place building systems are as follows:

1. Water intrusion testing for building envelope and penetrations via AAMA 501.1.

2. Roof water intrusion tests via ASTM D5957.

3. Adhesion pull testing per ASTM D4541-17 (for pull-off strength of coatings from metal (woods or plastic) surfaces: ASTM D7234 is for use for coatings from concrete surfaces)

4. Other testing as required by the specifications.

PART II -PRODUCTS – Not applicable to this section.

PART III -EXECUTION

3.01 QUALITY CONTROL

A. All testing shall be witnessed by the University's Representative, BECx, Architect and Special Inspector, as required. Notify the University's Representative of testing schedule 48 hours in advance.

B. Testing procedures:

1. **Contractor** shall conduct tests of mock-ups and final in place building systems in the presence of the University's Representative and the BECx. Proceed with each test as coordinated with the University Representative after **Contractor** notification that systems are ready, and the detailed outline of test procedure is accepted.

2. Test protocol requires that air infiltration testing precede water tests. Should it be necessary for a water test to be performed in advance of the air test, the specimen must be allowed to completely dry before air test.

3. The testing documentation shall be distributed and approved prior to proceeding to the next stage of envelope construction and at completion of the envelope.

4. Test reports shall include a description of the specific building enclosure system at the time of testing, date and time of test, description of test performed, listing of testing results, and all supporting measures data along with corrective recommendations as required.

5. If corrective work is to be performed, test shall be repeated, and a revised report submitted.

C. Corrective Measures:

1. Correct any deficiencies in the mock-up observed during testing and repeat tests as may be required to show compliance with the specified performance standards and the Contract Documents. Resubmit any submittals affected by these corrections. Resubmit Shop Drawings with changes made to assemblies to successfully complete preconstruction testing.

2. Deficiencies requiring repair or modification to the mock-up shall mandate a complete retesting of the mock-up beginning with the specified Preliminary Test unless otherwise requested by the University's Representative. If compliance with the performance standards is not achieved after 2 complete retests the **Contractor** shall replace mock-up completely with revised construction and start testing from the beginning.

3. Incorporate corrective measures indicated by the test report into the final exterior wall assemblies after review by the University's Representative.

D. Final Acceptance of the mock-up shall be done in writing:

1. Successful testing results and the completed test report are required for this acceptance and prior to start of work on final building systems in place.

3.02 BECx INSPECTIONS AND TESTING REQUIREMENTS

A. Provide all materials, labor, testing and documentation to execute the commissioning activities as described below and for elements of the building envelope as described in their individual Sections, including, but not limited to the following:

1. Water intrusion: 100% visual inspection of installed Work, performed in progress, documented by field reports, and in addition:

a. Below-grade construction, including foundation walls, below grade drainage and slabs-on-grade:

1) Inspections performed by qualified inspector approved by waterproofing system manufacturer provided by University Representative.

b. Above-grade construction, including: exterior wall systems and assemblies

1) Inspections performed by qualified Building Envelope Consultant provided by the University.

2) Perform water penetration testing on 10% of installed fenestration, of each type (glazed window, curtain wall and sloped glazing (skylight) systems).

3) Perform Stucco Wall Area Performance Testing at two additional locations as selected by the University's Representative.

4) Perform water penetration testing on a sample penetration within each type of enclosure system.

c. Roofing systems:

1) Steep-slope and low-slope roofing

a) Inspections performed by Certified Registered Roofing Observer provided by the University.

2) Waterproofing systems and assemblies over occupied space: outdoor plazas, planters and paving

a) Inspections performed by the qualified Building Envelope Consultant provided by the University.

d. Interface conditions (flashings, expansion joints, and sealant) between each of the materials, components and systems that comprise the above and below grade Building Envelope

1) Inspections performed by qualified Building Envelope Commissioning Consultant provided by the University.

a) Other testing as required by the specifications.

3.03 SEASONAL / DEFERRED TESTING

A. Provide an allowance for 8 hours' time to assist the University's Representative with seasonal or deferred functional performance testing during the warranty period.

END OF SECTION 01 91 10

SECTION 02070
SELECTIVE DEMOLITION

PART I - GENERAL

1.01 DESCRIPTION

A. Scope: Work under this Section shall include:

1. Provide selective demolition as indicated on the drawings and as required by new construction.

2. Asbestos and hazardous materials demolition or removal work is not part of this contract.

1.02 SUBMITTALS

A. Submit for approval selective demolition schedule, including schedule and methods for capping and continuing utility service.

1.03 QUALITY ASSURANCE

A. Comply with governing codes and regulations. Use experienced workmen.

1.04 PROJECT CONDITIONS

A. Coordinate all demolition work with Owner, with special attention to noise, dust, debris removal, or other disturbances.

B. Schedule utility shutdowns at least 48 hours in advance. Maintain fire protection services during demolition operations.

C. Remove debris, rubbish and other materials resulting from demolition operations from building site. Transport and legally dispose off site.

PART II - PRODUCTS – Not Applicable to this Section

PART III - EXECUTION

3.01 DEMOLITION

A. Do not damage building elements and improvements indicated to remain.

B. All items not listed for “salvage and return to Owner” remain property of Owner, and shall be collected for reuse or recycling as directed by the Owner’s Representative. Contractor shall not remove any items of salvage or recycle value from the project site without the express permission of the Owner’s Representative.

C. Do not close or obstruct streets, walkways, driveways or other occupied or used spaces or facilities without the written permission of the Owner and authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities.

D. Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.

3.02 SCHEDULE

A. Items to remain in place and protected for reuse: See section 01390 – Green Building Policy Implementation.

B. Items to be salvaged for reinstallation in this project:

C. Items to be salvaged and delivered to Owner:

1. Doors and hardware

2. Toilet accessories

3. Light fixtures

4. Plumbing fixtures

D. Utilities requiring interruption, capping, or removal.

END OF SECTION 02070

SECTION 05500
MISCELLANEOUS METAL FABRICATIONS

PART I - GENERAL

1.01 DESCRIPTION:

A. Scope: Work under this Section shall include all material and installation necessary to provide Miscellaneous Metal Fabrications, as shown and detailed on the drawing and specified herein.

1.02 QUALITY ASSURANCE

A. References:

1. 2022 California Building Code (CBC)

2. American Institute for Steel Construction (AISC): Steel Construction Manual, 13th Edition.

3. American Welding Society (AWS): D1.1 Structural Welding Code

4. National Association of Architectural Metal Manufacturers (NAAMM): Standards

5. Steel Structures Painting Council (SSPC): Painting Manual

B. QUALIFICATIONS:

1. General: Fabricator and installer specializing in the work of this Section with minimum three (3) years documented experience.

2. Welding: Performed by certified welders per AWS

1.03 SUBMITTALS

A. General: Refer to Section 01330 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Shop Drawings: Submit manufacture and installation details, including fastenings.

C. Product Data: None required for specified products; required for alternate products.

D. VOC compliance certificate signed by manufacturers certifying compliance of their products with regulations of authorities having jurisdiction over volatile organic compounds (VOCs).

1.04 PRODUCT HANDLING

A. General: Refer to Section 01310 – COORDINATION

B. Items Requiring Anchorage in Concrete: Deliver with complete setting diagrams, measurements, ICC evaluation reports, and manufacturer’s written instructions.

1.05 GUARANTEE

A. General: Refer to Section 01770 – CONTRACT CLOSEOUT.

B. Period: Provide in required form for a period of one (1) year from the date of final acceptance by the University's Representative.

PART II - PRODUCTS

2.01 MATERIALS

A. Steel Shapes:

1. General: ASTM A36 except ASTM A992 for wide-flange shapes

2. Steel Tubing: ASTM A500, Grade B

3. Steel Pipe: ASTM A53, Grade B

B. Fastenings:

1. General: Bolts, nuts, screws, washers, and other various fastenings necessary for proper erection of work. Galvanized steel fastenings or other non-rusting types for exterior steel work.

2. Exposed in Finished Surfaces: Tamperproof countersunk Phillips flat head screws, unless otherwise shown; finish to match adjacent surfaces.

3. Plastic Screw Anchors:

a. Type HUD, manufactured by Hilti, Inc.

b. Star Anchors and Specialty Fasteners, Inc., or equal.

C. Post-installed Anchors:

1. Except where indicated on the drawings, post-installed anchors shall consist of the following anchor types as provided by Hilti, Inc. or approved equal.

a. Anchorage to concrete

i) Adhesive anchors for cracked/uncracked concrete use:

1) Hilti HIT-HY 200 Safe Set System with HILTI HIT-Z rod per ICC ESR-3187
2) Hilti HIT-HY 200 Safe Set System with HILTI Hollow Drill Bit System with threaded rod per ICC ESR-3187.
3) Hilti HIT-RE 500-SD Epoxy Adhesive Anchoring System with threaded rod per ICC ESR-2322 for slow cure applications
4) ITW Red Head EPCON G5 per ICC-ESR 1137
5) Powers PE 1000 per ICC-ESR 2583

ii) Medium duty mechanical anchors for cracked/uncracked concrete

1) Hilti KWIK HUS EZ and KWIK HUS EZ-I screw anchors per ICC ESR-3027
2) Hilti KWIK BOLT-TZ expansion anchors per ICC ESR-1917
3) ITW Red Head PER ICC-ESR 2427
4) Powers Power-Stud SD2 per ICC-ESR 2502

iii) Heavy duty mechanical anchors for cracked concrete use

1) Hilti HDA undercut anchors per ICC ESR 1546
2) Hilti HSL-3 expansion anchors per ICC ESR 1545
3) USP DUC undercut anchors per ICC ESR 1970

b) Rebar doweling into concrete

i) Adhesive anchors for cracked concrete use

1) Hilti HIT-HY 200 Safe Set System with Hilti Hollow Drill Bit System with continuously deformed rebar per ICC ESR-3187.
2) Hilti HIT-RE 500-SD Epoxy Adhesive Anchoring System with continuously deformed rebar per ICC ESR-2322.
3) ITW Red Head EPCON G5 per ICC-ESR 1137
4) Powers PE 1000 per ICC-ESR 2583

c) Anchorage to solid grouted masonry

i) Adhesive anchors use

:

1) Hilti HIT-HY 70 Masonry Adhesive Anchoring System per ICC-ESR 3342
2) Steel anchor element shall be Hilti HAS-E continuously threaded rod or continuously deformed steel rebar
3) Simpson Acrylic Tie Adhesive Anchor System per ICC-ESR 1958
4) Powers T 38+ Epoxy per ICC-ESR 3149

ii) Mechanical anchors use

1) Hilti KWIK BOLT-3 Expansion Anchors per ICC ESR 1385
2) Hilti KWIK-HUS EZ Screw Anchors per ICC-ESR 3056
3) Simpson Titen Screw Anchors per ICC-ESR 1056
4) Powers Wedge Bolt per ICC-ESR 1678

d) Anchorage to hollow/multi-wythe masonry

i) Adhesive anchors use

1) Hilti HIT-HY 70 Masonry Adhesive Anchoring System per ICC ESR-3342.
2) Steel anchor element shall be Hilti HAS-E continuously threaded rod or continuously deformed steel rebar.
3) The appropriate size screen tube shall be used per adhesive manufacturer’s recommendation.
4) Simpson Acrylic Tie Adhesive Anchor per ICC-ESR 1958

2) Anchor capacity used in design shall be based on the technical data published by the manufacturer or such other method as approved by the Structural Engineer of Record. Substitution requests for alternate products must be approved in writing by the Structural Engineer of Record prior to use. Contractor shall provide calculations demonstrating that the substituted product is capable of achieving the performance values of the specified product. Substitutions will be evaluated by their having an ICC ESR showing compliance with the relevant building code for seismic uses, load resistance, installation category, and availability of comprehensive installation instructions. Adhesive anchor evaluation will also consider creep, in-service temperature and installation temperature.

3) Install anchors per the manufacturer instructions, as included in the anchor packaging.

4) Overhead adhesive anchors must follow manufacturer's printed installation procedures.

5) The contractor shall arrange an anchor manufacturer's representative to provide onsite installation training for all of their anchoring products specified. The Structural Engineer of Record must receive documented confirmation that all of the contractor's personnel who install anchors are trained prior to the commencement of installing anchors.

6) Anchor capacity is dependent upon spacing between adjacent anchors and proximity of anchors to edge of concrete. Install anchors in accordance with spacing and edge clearances indicated on the drawings.

7) Existing reinforcing bars in the concrete structure may conflict with specific anchor locations. Unless noted on the drawings that the bars can be cut, the contractor shall review the existing structural drawings and shall undertake to locate the position of the reinforcing bars at the locations of the concrete anchors, by Hilti Ferroscan, GPR, X-Ray, chipping or other means.

D. Non-Shrink Grout:

1. "Embco" manufactured by BASF Corporation

2. W.R. Meadows, Inc, or equal.

E. Primer: Per Section 09900 – PAINTING

2.02 FABRICATION

A. Workmanship:

1. General: Shop assemble work in largest practical sections; minimize field connections. Grind smooth parts exposed to view; remove weld marks and leave free of fabrication marks. Miter corners and edges unless otherwise shown. Make members true to length so assembling may be done without fillers. Bends, twists, open joints in finished members, or projecting edges or corners at connections will not be permitted. Miter, cope, and block carefully to produce tight hairline joints. Provide lugs, clips, connections, bolts, and fastenings necessary to complete fabrication.

2. Galvanizing: Treat all areas burned off or damaged during fabrication with specified repair compound.

3. Reinforcement: Provide proper reinforcement for hardware, and other fabricated metal work, as required.

4. Welding: Use sequence welding to minimize distortion and heat stresses. Weld by shielded electric arc process per AWS. Use continuous welding along entire area of contact, except where spot welding is permitted. Grind all welds smooth on exposed surfaces. Spot welding not permitted on exposed surfaces.

5. Shop Painting: Per SSPC standards.

B. Fabrications:

1. Bollards:

a. Steel pipe sections with open ends capped, welded and ground smooth.

b. Removable Bollards: Provide galvanized sleeves for setting removable posts. Drill ¼” hole in top cap of removable barriers.

2. Ladder:

a. General: Ladder shall meet CAL-OSHA requirements. Fabricate from steel sections per NAAMM Standards; punch side railings to receive steel rungs; space rungs at 12” on center; extend through stringers, weld around each end and grind smooth.

b. Rung shall be coated with non-skid surface.

3. Safety Post:

a. LadderUp Safety post, Model No. 1, manufactured by the Bilco Co.

b. Or equal.

4. Fasteners: As shown.

PART III - EXECUTION

3.01 PREPARATION

A. General: Refer to Section 01310 – COORDINATION

B. Conditions of Work in Place: Carefully examine before beginning work; report defects.

C. Job Measurements: Take field measurements; report discrepancies between plan and field dimensions.

3.02 INSTALLATION

A. Performance:

1. General: Install with workmen skilled in the particular type of work required and in accordance with the written instructions of the manufacturers.

2. Coordination: Deliver miscellaneous metal items to be installed in concrete or masonry, complete with all clips, anchors or bolts necessary to secure them in place.

3. Workmanship: Set work plumb and true; properly assemble and erect in a rigid and workmanlike manner. Do cutting, punching, drilling and tapping for attachment of other work coming into contact with fabricated metal work where indicated or as directed. Do necessary cutting, drilling, and fitting for installation of fabricated metal work. Execute drilling, cutting, and fitting carefully; when required, fit work at job before finishing. No burning in field permitted. Replace, or repair parts damaged or injured during erection in an acceptable manner. Drill holes for fasteners to exact diameter as recommended by fastener manufacturer. Oversized holes or holes not properly located that produce misalignment of fastener will be rejected.

4. Field Touch-up: Touch-up damaged surfaces and field welds of steel, scheduled to be painted, per SSPC standards.

5. Protection: After erection, provide proper protection for fabricated metal items from other construction operations.

B. Installation:

1. Bollards:

a. General: Set in concrete and fill, as shown.

b. Removable Bollards: Set sleeves with removable cap in concrete as shown; provide smooth insertion and removal of bollard.

2. Ladder:

a. General: Fasten at top, bottom, and intermediate points not over 6'-0" apart with brackets for fastening; use expansion bolts, unless otherwise shown.

b. Safety Post: Install at center line of top two rungs on all fixed ladders located below roof hatches. Verify smooth and proper extension to full 42” height.

C. Non-shrink grout:

1. Convene pre-application meeting two (2) weeks before start of application of non-shrink grout.

2. Require attendance of parties directly affecting work of this section, including contractor, architect, engineer, applicator, and manufacturer’s representative.

3. Review materials, surface preparation, forming, mixing, placing, curing, protection, and coordination with other work.

END OF SECTION 05500

SECTION 070500
MEMBRANE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof re-cover preparation of entire roof system.

2. Substrate board

3. Roofing protection board

4. Roof insulation protection board

5. Barrier board

6. Re-cover board

1.2 SUBMITTALS

A. Product data: Submit manufacturer’s descriptive literature indicating material composition, thickness, sizes and fire resistance that relate to the specified roof assembly.

B. Shop drawings: Submit shop drawings indicating fastener and adhesive patterns for FMG wind uplift resistance specified.

1.3 DELIVERY STORAGE AND HANDLING

A. Delivery: Deliver materials to the job site in manufacturer’s original packaging, containers, and bundles with manufacturer’s brand name and identification intact and legible.

B. B. Storage: Keep Roof Board panels dry before, during, and after application. Outside storage must be off the ground and protected by a breathable waterproof covering.

C. Roof Board panels must be covered the same day as laid. Store all panels flat. Damaged materials shall be removed from the premises.

D. Roof Board panels should be cut to size using utility knife and straight edge. Score surface with utility knife and bend board up sharply toward score. Use keyhole-type drywall saw or recommended score and knock-out method for penetration cut-outs and radiuses.

1.4 QUALITY ASSURANCE

A. Consult roofing manufacturers for specific instructions on the application of their products to Roof Board panels.

B. Weather conditions, dew, application temperature, installation techniques and moisture drive can have adverse effects on the performance of the roof system.

C. Keep all roof board panels dry before, during and after installation. Roof board panels should not be installed during rains, heavy fogs and any other conditions that deposit moisture on the surface of the board. Apply only as many roof board panels that can be covered by final roof membrane system in the same day. Avoid exposure to moisture from leaks or condensation.

D. Moisture from inside the building can be as big a risk for the roof system as moisture from outside. The contractor installing the roof and the design professional should protect the roof assembly not only from excessive moisture during the construction of the building (new concrete, paint, plaster materials) but also after the building is dried in. the HVAC system must properly manage moisture generated by the occupants of the building to make sure it is vented to the outside and does not migrate into the roof system.

E. For re-roof or re-cover applications, existing roofing system must be dry throughout prior to application of roof board panels.

F. Plastic or poly packaging applied at the plant to protect board during rail or other transit should be removed upon receipt to prevent condensation or trapping of moisture, which may cause application problems.

G. Roof board panels should be stored flat and off the ground with protection from the weather. If stored outdoors, a breathable waterproof covering should be used.

H. When applying solvent-based adhesives or primers, allow sufficient time for the solvent to evaporate to avoid damage to roofing components.

I. Locate edge joints on, and parallel to, deck ribs. Stagger end joints of adjacent lengths of roof board panels. All board edges should be loosely abutted and never kicked in tight in typical installations Partial Roof Tear-Off: Removal of a portion of existing membrane roofing system from deck or removal of selected components and accessories from existing membrane roofing system.

PART 2 - PRODUCTS

2.1 Gypsum Roof Board:

A. USG Securock® Brand Gypsum-Fiber Roof Board
   1. Acceptable product and manufacturer: ½", and USG Securock Gypsum-Fiber Roof Board as manufactured by United States Gypsum Company.
   2. Composition: Impact-resistant, nonstructural, fiber-reinforced gypsum panels manufactured with a minimum 97% certified recycled content, with moisture and

mold resistance throughout the panel core and surface; manufactured to conform to ASTM C1278.

3. Fiber Reinforced Gypsum Panel
   a. Size: Nominal 4' x 8', 4' x 4'
   b. Edges: Square
   c. Facers: None
   d. Flexural strength, parallel, lbs. min. per ASTM C473: ½" = 110
   e. Compressive strength, psi, nominal: ½" = 1800
   f. Flute spanability per ASTM E661: ½" = 8
   g. Permeance, perms per ASTM E96: ½" = 26
   h. R Value per ASTM E96: ½" = 0.5
   i. Coefficient of thermal expansion, inches/inch.F, per ASTM E 831:8.0 x 10^6
   j. Linear variation with change in moisture, inches/inch .%RH, per ASTM D1037: 8.0 x 10^6
   k. Water absorption, % max, per ASTM C473: 10
   l. Surface water absorption nominal grams per ASTM C473: ≤ 1.6 grams
   m. Mold resistance per ASTM D3273: 10
   n. Bending radius: ¼", ⅜", ½" = 25'; ⅝" = 30'
   o. Recycled Content: min. 97% recycled content certified Scientific Certification Systems.

B. Miscellaneous Materials
   1. FM-approved plates and fasteners: Provide size and type in accordance with FM requirements, local code requirements, and roof system manufacturer's written recommendations. Stress plates shall be configured for application over hard surfaces.
   2. Adhesives: As recommended by roof system manufacturer.

PART 3 - EXECUTION

3.1 PREPARATION, GENERAL

A. Provide roof board panels where indicated on drawings using fastening system specified.

B. Use maximum lengths possible to minimize number of joints. Support edge joints with deck ribs. Stagger end joints of adjacent lengths of USG Securock High-Performance Roof Board panels. Ends and edges are typically loosely butted.

3.2 Roof Board Installation

A. Refer to roof system manufacturer's written instructions, local code requirements and Factory Mutual Global (FMG and/or Underwriters Laboratories (UL) requirements for proper installation techniques.

B. Use fasteners specified in accordance with above requirements. Install approved fasteners with plates into the USG Securock High-Performance Roof Board panels, flush with the surface. Fasteners should be installed in strict compliance with the roof system manufacturer's installation recommendations and FMG Loss Prevention Data Sheet 1-29. Proper fastener spacing is essential to achieve wind-uplift performance.

C. Locate edge joints on, and parallel to, deck ribs. Stagger end joints of adjacent lengths of USG Securock High-Performance Roof Board panels. All board edges should be loosely abutted and never kicked in tight in typcal installations.

D. See product data table for maximum flute span when panels are applied directly over metal decking.

3.3 Parapet (Wall) Framing and Fastening

A. As recommended by roof system manufacturer, adhesive manufacturer, or any code body guidelines.

B. Use appropriate corrosion-resistant fasteners as defined by roof system manufacturer.

C. Use minimum ½" USG Securock High-Performance Roof Board for vertical wall applications.

D. Maximum parapet framing spacing: 24" o.c. for ½" and ⅝" USG Securock High-Performance Roof Board.

E. Fasten a maximum 8" o.c. around the perimeter and 8" o.c. on framing members in the field of the panel. Minimum fastener penetration in wood framing is ¾" and in steel framing is ⅜".

END OF SECTION 07500

SECTION 07600
FLASHING AND SHEET METAL

PART I - GENERAL

1.01 DESCRIPTION:

A. Scope: Work under this Section shall include all materials and installation necessary to provide Flashing and Sheet Metal, as shown and detailed on the drawings and specified herein.

B. Related Work Specified Elsewhere:

1. Division 5, Section 05500 – Miscellaneous Metal Fabrications

2. Division 9, Section 09900 – Painting

1.02 QUALITY ASSURANCE

A. References:

1. National Roofing Contractors Association (NRCA): Roofing Manual.

2. Sheet Metal and Air Conditioning Contractors National Association (SMACNA): Sheet Metal Manual.

B. Qualifications: Installer specializing in the work of this Section with minimum three (3) years documented experience; manufacturer approved.

1.03 SUBMITTALS

A. General: Refer to Section 01330 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Shop Drawings: None required for specified products; required for alternate products.

C. Samples: If specifically requested.

D. Product Data: None required for specified products; required for alternate products.

1.04 PRODUCT HANDLING

A. General: Refer to Section 01310 – COORDINATION.

B. Storage: Stack preformed material to prevent twisting, bending or abrasion; slope to ensure drainage.

1.05 MAINTENANCE

A. General: Refer to Section 01770 – CLOSEOUT PROCEDURES

B. Guarantee: Provide in required form for a period of two (2) years from date of final acceptance by University.

PART II - PRODUCTS

2.01 MATERIALS

A. Sheet Material:

1. Galvanized Sheet Metal: ASTM A446, Grade A, G90 zinc coating; 24 gage minimum, core steel.

2. Aluminum: ASTM B209, 3003 alloy, 18 gage with clear [color] anodized finish.

B. Underlayment: ASTM D226, 15 lb. asphalt saturated roofing felt, unperforated.

C. Fasteners:

1. Nails:

a. General: FS FF-N-105.

b. Steel Nails: Hot-dipped galvanized, annular thread, size as required.

c. Concrete Nails: Flat head, size as required.

d. Aluminum Nails: Annular thread, size as required.

2. Rivets: ⅛" diameter; solid type.

3. Washers: Lead or neoprene, where required.

4. Lead Plugs: Size as required.

D. Solder:

1. General: ASTM B32; 50/50 type.

2. Flux: FS O-F-506.

E. Galvanizing Repair Treatment:

1. Rod: Per ASTM A780.

2. Coating: Per MIL-P-46105.

F. Protective Coatings:

1. General: FS TT-C-494, Type II; bituminous.

2. Backing Paint: Zinc chromate, alkyd.

G. Plastic Cement: FS SS-C-153, Type I; asphaltic.

H. Sealing Tape:

1. No. 606 Architectural Sealant Tape as manufactured by Protective Treatments, Inc.,

2. Or equal, no known equal.

I. Sealants: FS TT-S-230, non-hardening, non-sagging.

2.02 COMPONENTS

A. Reglets:

1. O'Keefe's, Inc.; extruded aluminum with butyl rubber sealer and removable snap-in base flashing,

2. Or equal, no known equal.

3. Cast-in-Place Concrete: Type C.

4. Masonry: Type M.

5. Surface Applied: Type E.

2.03 FABRICATION

A. Manufacture:

1. General: Form sections, per referenced standards, true to shape, accurate in size, square, and free from distortion or defects. Form pieces in single length sheets, not to exceed 10'-0" in length. Hem exposed edges on underside ½"; miter and seam corners.

2. Seams: Flat lock.

3. Corners: One piece with minimum 18" long legs; solder for rigidity, seal with sealant.

4. Cleats: Minimum 2" wide, interlockable with sheet.

5. Vertical Faces: Bottom edge formed outward ¼" and hemmed to form drip.

6. Flashing Toe: Extend toe 2" over roofing; return and brake edges.

7. Soldering: Solder shop formed metal joints. After soldering, remove flux; wipe and wash solder joints clean. Weather seal joints.

8. Back Painting: Paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

B. Assemblies:

1. General: Fabricate with galvanized sheet metal, unless otherwise shown.

2. Flashing:

a. Exterior Hollow Metal Frame Flashing: 18 gages, as shown.

b. Gravel Stops: Form corners with interlocking joint, soldered and ground smooth.

3. Roof Drainage:

a. Overflows and Scuppers: As detailed, with flange and outlet hemmed and joints fully soldered.

PART III - EXECUTION

3.01 PREPARATION

A. General: Refer to Section 01310 – COORDINATION.

B. Examination: Examine conditions of work in place before beginning work; report defects.

C. Measurements: Take field measurements; report variance between plan and field dimensions.

3.02 INSTALLATION

A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.

B. Underlayment: Apply one (1) layer of felt underlayment over surfaces as shown; lap all edges 6” minimum, in direction of slope.

C. Application:

1. General: Make corners square, surfaces true and straight in planes, and lines accurate to profiles. Fit sheet metal tight in place; secure using concealed fasteners. Apply plastic cement compound between metal flashings and felt flashings. Seal metal joints watertight.

2. Expansion and Contraction: Allow for expansion and contraction over an ambient temperature range up to 150ºF; distortions resulting from fastening or expansion and contraction stresses not acceptable

3. Dissimilar Metals: Isolate with heavy coat of bituminous paint. Coat all sheet metal in contact with roofing felts.

D. Components: Install as shown; set flashing to form watertight fit.

E. Assemblies:

1. Flashing:

a. General: Install flashings where shown; miter and solder joints at corners. Lap joints in counterflashing at least 6” and make watertight with sealing tape. Extend counterflashing down not less than 6”.

b. Exterior Hollow Metal Frame Flashing: Provide at frame heads, as shown.

c. Gravel Stops: Set on top of roofing felts in ⅛" thick bed of plastic cement, with laps filled; close ends at scuppers.

2. Overflows and Scuppers: As shown; fit outlet tightly into collar flashing.

F. Sealants: As shown; per manufacturer's directions.

G. Galvanizing Repair Treatment: Repair damaged zinc coating with specified repair compound, as required.

3.03 CLEANING

A. General: Keep premises free from accumulation of waste and rubbish. At the completion of work remove surplus materials, rubbish, and debris and thoroughly clean exposed surfaces.

END OF SECTION 07600

SECTION 07920
CAULKING AND SEALANTS

PART I - GENERAL

1.01 DESCRIPTION:

A. Scope: Work of this Section shall include all materials and installation necessary to provide Caulking and Sealants, as shown and detailed on the drawings and specified herein.

1.02 QUALITY ASSURANCE

A. References:

1. Sealant, Waterproofing and Restoration Institute (SWRI): Sealant and Caulking Guide Specification.

B. QUALIFICATIONS:

1. General: The manufacturer of the sealant used shall have been in the business of manufacturing the specified types of such sealants for not less than ten (10) years.

2. Applicator: Installer specializing in the work of this Section with minimum five (5) years documented experience

3. Volatile Organic Compounds (VOC): Use only products in compliance with VOC content limits required by Federal and State EPA regulations.

C. Compatibility With Substrate: Verify that caulking and sealants used are compatible with joint materials.

D. Joint Tolerances: Comply with manufacturer's joint width/depth ratio limitations.

1.03 SUBMITTALS

A. General: Refer to Section 01330 – SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

B. Samples: Submit manufacturer's standard colors prior to application.

C. Product Data: Submit manufacturer's specifications, data, and installation instructions for review prior to purchase or application.

D. Certificates: Submit certification that sealants proposed for use, comply with the Contract Documents.

1.04 PRODUCT HANDLING

A. General: Refer to Section 01310 – COORDINATION.

B. Storage: Per manufacturer's recommendations for proper precautions for shelf life, temperature, humidity and similar storage factors to ensure the fitness of the material when installed.

1.05 SITE CONDITIONS

A. Environmental Requirements: Do not apply materials when temperature is below 40°F, nor under extreme temperature conditions when joint openings are at maximum or minimum width.

1.06 MAINTENANCE

A. General: Refer to Section 01770 – CLOSEOUT PROCEDURES.

B. Guarantee: On form provided at end of Section 01780 – CLOSE OUT SUBMITTALS, provide five (5) year written guarantee commencing from date of final acceptance by University's Representative.

PART II - PRODUCTS

2.01 MATERIALS

A. Caulking And Sealants:

1. Manufactured by Tremco, Inc., unless otherwise noted.

2. Pecora Chemical Corp., or equal.

3. Color to be selected by University's Representative.

B. Exterior Joints:

1. Vertical Surfaces: Non-sag polyurethane; by Dymeric or equal.

2. Precompressed Expanding Sealant Tape:

a. PC-SA manufactured by Emseal Joint Systems, Ltd.

b. Pecora Chemical Corp., or equal.

3. Horizontal Paving Joints: Self-leveling polyurethane; THC 900; interior and exterior.

C. Interior Joints: Acrylic Latex.

D. Joint Cleaner: Provide cleaner recommended by sealant manufacturer for specific joint surface and condition.

E. Joint Primer and Sealer: As recommended by sealant manufacturer for each condition.

F. Bond Breaker Tape: Pressure sensitive polyethylene tape.

G. Other Materials: Manufacturer's standard for items required or type best suited for intended use.

PART III - EXECUTION

3.01 PREPARATION

A. General: Refer to Section 01310 – COORDINATION.

B. Conditions Of Work In Place:

1. General: Carefully examine before beginning work; report defects.

2. Substrate: Inspect surfaces to insure that no bond-breaker materials contaminate the surface to which the sealant is to adhere and to ensure that unsound substrates are repaired.

C. Preparation Of Surfaces:

1. Surfaces: Prepare joints in accordance with manufacturer's recommended instruction to ensure maximum adhesion. Prime as required, protecting adjacent exposed surfaces.

2. Sealants: Prepare sealant as required, including proper mixing of multicomponent sealants.

3.02 APPLICATION

A. General: Install in conformance with referenced standards, manufacturer's written directions, as shown, and as specified.

B. Protection: Protect surfaces adjacent to joints to receive sealant. Cover joints in walking surfaces with heavy duty, non-staining tape, until material has dried.

C. Installation:

1. General: Install sealant materials per manufacturer's instructions. Prevent three-sided adhesion. Provide sealant depth of ½ joint width; minimum depth of ¼"; maximum of ½", unless otherwise required by the manufacturer.

2. Backer Rod: Install using blunt or rounded tools to insure uniform (±⅛") depth without puncturing material. Use oversize backer rod; minimum of 33% for closed cell type; minimum of 50% for open cell type, unless otherwise required by the manufacturer.

3.03 CLEANING

A. General: Upon completion, thoroughly clean exposed surfaces per manufacturer's instructions. Perform cleaning in a manner that will not affect the appearance of the sealant or the adjacent finish material.

END OF SECTION 07920

SECTION 070150.19
PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Roof replacement preparation consisting of full roof tear-off of entire roof system.

2. Removal of flashings and counterflashings.

3. Removal and reinstallation of indicated components, accessories, and equipment.

B. Related Information:

1. Division 01 Section "Summary" for use of the premises and phasing requirements, and for restrictions on use of the premises due to Owner or tenant occupancy.

2. Division 01 Section "Construction Waste Management and Disposal" for disposal, salvaging, and recycling of demolition and construction waste and submittal of Waste Management Plan.

3. Division 01 Section "Sustainable Design Requirements" for general requirements for sustainable design.

4. Division 02 Section "Selective Demolition" for selective demolition work not directly related to re-roofing work.

1.2 DESCRIPTION OF WORK

A. Re-roofing preparation Work consists of the following:

1. Preparation for Roof Area:

a. Preparation for: Roof replacement.

b. Existing Roof Type: Adhered single ply.

c. Existing Deck Type: Concrete deck.

d. Roof tear-off.

e. Removal and reinstallation of indicated components, accessories, and equipment.

f. Removal of base flashings.

1.3 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

1.4 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

B. Existing Roofing System: Roofing system identified above, including roof covering/membrane, roof insulation, surfacing, and components and accessories between deck and roof covering/membrane.

C. Full Roof Tear-Off: Removal of existing membrane roofing system from deck.

D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

E. Existing to Remain: Existing items of construction that are not indicated to be removed.

F. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

G. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

H. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

I. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

J. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.

K. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.5 PREINSTALLATION MEETINGS

A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project site.

1. Coordinate with roofing preinstallation meetings specified in Division 07 roofing section(s).

2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:

a. Reroofing preparation, including roofing system manufacturer's written instructions.

b. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.

c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.

d. Existing roof deck conditions requiring Architect notification.

e. Condition and acceptance of existing roof deck and base flashing substrate for reuse.

f. Structural loading limitations of roof deck during reroofing.

g. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.

h. HVAC shutdown and sealing of air intakes.

i. Governing regulations and requirements for insurance and certificates if applicable.

1.6 INFORMATIONAL SUBMITTALS

A. Digital Images or Videos: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, which might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

B. Schedule of Re-Roofing Preparation Activities: Indicate the following:

1. Detailed sequence of re-roofing preparation work, with starting and ending dates for each activity. Ensure occupants' on-site operations are uninterrupted.

2. Use of elevator and stairs.

3. Coordination of Owner's continuing occupancy of portions of existing building.

1.7 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with governing EPA notification regulations before beginning membrane roofing removal.

2. Comply with hauling and disposal regulations of authorities having jurisdiction.

1.8 PROJECT / FIELD CONDITIONS

A. Owner will occupy portions of building immediately below reroofing area.

1. Conduct reroofing so Owner's operations will not be disrupted.

2. Provide Owner with not less than 48 hours' written notice of activities that may affect Owner's operations.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Limit construction loads on roof to rooftop equipment wheel loads and uniformly distributed loads not exceeding recommendations of Contractor's professional engineer based upon site inspection and analysis.

E. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

1. Remove only as much roofing in one day as can be made watertight in the same day.

F. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

G. Hazardous Materials: It is not expected that hazardous materials such as asbestos-containing materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

a. Obtain direction from Owner before proceeding with work in the affected area.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

A. EPS Insulation: Molded (expanded) polystyrene, ASTM C578.

B. Plywood: NIST DOC PS 1, Grade CD, Exposure 1.

C. Oriented Strand Board (OSB): NIST DOC PS 2, Exposure 1.

2.2 DECK REPAIR/REPLACEMENT MATERIALS

A. Concrete Deck Repair Materials:

1. Bonding Agent: Epoxy-modified, cementitious bonding and anticorrosion agent consisting of water-insensitive epoxy adhesive, portland cement, and water-based solution of corrosion-inhibiting chemicals that forms a protective film on steel reinforcement.

2. Patching Mortar: Trowelable cementitious repair mortar for vertical and overhead, repairs up to 2 inches (50 mm) per lift, one component, fiber reinforced, polymer modified repair mortar containing corrosion inhibitor.

a. Compressive Strength: Not less than 6000 psi (41400 kPa) at 28 days when tested according to ASTM C 109/C 109M, modified 2-inch (50-mm) cubes.

2.3 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are responsibilities of Contractor.

2.4 TEMPORARY ROOF DRAINAGE

A. Design and selection of materials for temporary roof drainage are responsibilities of the Contractor.

PART 3 - EXECUTION

3.1 PREPARATION, GENERAL

A. Test existing roof drains to verify that they are not blocked or restricted.

1. Immediately notify Owner of any blockages or restrictions.

B. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.

1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

C. Pollution Control: Comply with environmental regulations of authorities having jurisdiction. Limit spread of dust and debris.

1. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

2. Remove debris from building roof by chute, hoist, or other device that will convey debris to grade level.

D. Temporary Weather Protection: During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

E. Roof Drain Protection: Maintain roof drains in functioning condition to ensure roof drainage at end of each workday.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new membrane roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing membrane roofing system components that are to remain.

2. Prevent debris from entering or blocking roof drains and conductors.

a. Use roof-drain plugs specifically designed for this purpose.

b. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

3.2 ROOF TEAR-OFF

A. Notify Owner each day of extent of roof tear-off proposed for that day.

B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.

C. Roof Drainage: Remove roof drainage items indicated for removal.

D. Roof Tear-Off: Remove existing roofing membrane and other membrane roofing system components down to the deck.

1. Remove cover boards and roof insulation.

2. Remove fasteners from deck or cut fasteners off slightly above deck surface.

E. Roof Edge Specialties: Replace existing perimeter metal systems with new perimeter metal systems.

1. New perimeter metal systems (fascia and coping) are specified in Division 07 Section "Sheet Metal Flashing and Trim."

F. Inspect wood blocking, curbs, and nailers for deterioration and damage.

1. Replace existing wood components that exhibit signs of deterioration or other conditions detrimental to securement of roofing system components, including roof edge flashings.

2. Reuse of Existing Wood Nailers: Permitted where type, size and securement are in accordance with Factory Mutual Loss Prevention Data Bulletin 1-49; and existing wood nailers exhibit no signs of deterioration or other conditions detrimental to securement of new roofing system in conformance with specified requirements.

3.3 DECK PREPARATION

A. Inspect deck after tear-off of membrane roofing system.

B. Verify that deck is sound and dry.

C. Unsuitable Deck: If deck surface is not suitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.4 DECK REPAIR/REPLACEMENT

A. Repair existing deck to provide smooth working surface for installation of roof system.

B. Concrete Deck Repair:

1. Remove spalled or deteriorated deck areas until sound base is reached.

2. Apply bonding agent and install patching mortar in accordance with manufacturer's instructions.

3. Allow patching mortar to fully set.

3.5 BASE FLASHING REMOVAL

A. Remove existing base flashings around parapets, curbs, walls, and penetrations.

1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Do not damage metal counterflashings that are to remain.

1. Replace metal counterflashings damaged during removal with counterflashings specified in Division 07 Section "Sheet Metal Flashing and Trim."

3.6 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

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

3.7 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by preparation for re-roofing operations. Return adjacent areas to condition existing before operations began.

END OF SECTION 070150.19

SECTION 075416
KEE ROOFING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Adhered thermoplastic KEE roofing system on a prepared existing roof substrate, including:
2. Roof insulation.
3. Roof insulation cover board.
4. Walkway material.
5. Vapor extracting vents

B. Related Sections:

1. Division 07 Section 07600 " Flashing and Sheet Metal " for shop-formed sheet metal items including roof drainage system items, roof penetration flashings, base and counterflashings and reglets.
2. Division 07 Section "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

C. Alternates: Refer to Division 01 Section "Alternates" for description of Work in this Section affected by alternates.

D. Allowances: Refer to Division 01 Section "Allowances" for description of Work in this Section affected by allowances.

1.2 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 "Standard Terminology Relating to Roofing and Waterproofing" and glossary in applicable edition of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" for definition of terms related to roofing work in this Section.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review drawings and specifications.
3. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
4. Review and finalize construction schedule and verify availability of materials,

Installer's personnel, equipment, and facilities needed to make progress and avoid delays.

5. Examine substrate conditions and finishes for compliance with requirements, including flatness and fastening.
6. Review structural loading limitations of roof deck during and after roofing.
7. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
8. Review governing regulations and requirements for insurance and certificates if applicable.
9. Review temporary protection requirements for roofing system during and after installation.
10. Review roof observation and repair procedures after roofing installation.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. SDS: For each type of product indicated.

1.5 INFORMATIONAL SUBMITTALS

A. Contractor's Product Certificate: Submit certificate, indicating products intended for Work of this Section, including product names and numbers and manufacturers' names, with statement indicating that products to be provided meet the requirements of the Contract Documents.
B. Qualification Data: For Installer, Manufacturer and Roofing Inspector.

1. Include letter from Manufacturer written for this Project indicating approval of Installer.

C. Warranties: Unexecuted sample copies of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Executed copies of warranties.
B. Maintenance Data: To include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and certified by manufacturer, including a full-time on-site supervisor with a minimum of five years' experience installing products comparable to those specified, able to communicate verbally with Contractor, Architect, and employees, and qualified by the manufacturer to install manufacturer's product and furnish warranty of type specified.
B. Manufacturer Qualifications: Approved manufacturer listed in this Section, UL listed for roofing systems comparable to that specified for this Project, with minimum five years' experience in manufacture of thermoplastic roof membrane products in successful use in similar applications.
C. Roofing Inspector Qualifications: A technical representative of manufacturer not engaged in the sale of products and experienced in the installation and maintenance of the specified roofing system, qualified to perform roofing observation and inspection specified in Field Quality Control Article, to determine Installer's compliance with the requirements of this

Project, and approved by the manufacturer to issue warranty certification. The Roofing Inspector shall be the following:

1. An authorized full-time technical employee of the manufacturer.

D. Manufacturer's Installation Instructions: Obtain and maintain on-site access to manufacturer's written recommendations and instructions for installation of products.

1.8 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, approval or listing agency markings, 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.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

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. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.9 PROJECT / FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. Daily Protection: Coordinate installation of roofing so insulation and other components of roofing system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.

1. Provide tie-offs at end of each day's work to cover exposed roofing and insulation with a course of roofing sheet securely in place with joints and edges sealed.
2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing.
3. Remove temporary plugs from roof drains at end of each day.
4. Remove and discard temporary seals before beginning work on adjoining roofing.

1.10 WARRANTY

A. Manufacturer's Warranty: Roof System Manufacturer's standard form in which Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within warranty period, as follows.

1. Form of Warranty: Manufacturer's standard warranty form.

2. Scope of Warranty: Work of this Section and including sheet metal details and termination details installed by the roof system Installer and approved by the Roof System Manufacturer.
3. Warranty Period: 30 years from date of completion.

B. Manufacturer Inspection Services: By manufacturer's technical representative, to report maintenance responsibilities to Owner necessary for preservation of Owner's warranty rights. The cost of manufacturer's inspections is included in the Contract Sum.

1. Inspections to occur in following years: 2, 5, 10, 15, 20, 25 following completion.

C. Installer Warranty: Installer's warranty signed by Installer, as follows.

1. Form of Warranty: Form acceptable to Roofing Manufacturer and Owner.
2. Scope of Warranty: Work of this Section.
3. Warranty Period: 2 years from date of completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: The roof system specified in this Section is based upon products of Tremco, Inc., Beachwood, OH, (800) 562-2728, www.tremcoroofing.com that are named in other Part 2 articles. Provide specified products or equal.
B. Source Limitations: Obtain components for roofing system from same manufacturer as membrane roofing or manufacturer approved by membrane roofing manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Membrane roofing and base flashings shall remain watertight.

1. Accelerated Weathering: Roofing system shall withstand 10,000 hours of exposure when tested according to ASTM G152, ASTM G154, or ASTM G155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D3746/D3746M, ASTM D4272/D4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Exterior Fire-Test Exposure: ASTM E108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.
C. Energy Performance: Roofing system shall have an initial solar reflectance index of not less than 0.70 and an emissivity of not less than 0.75 when tested according to CRRC-1.

2.3 MATERIALS, GENERAL

A. Material Compatibility: Roofing materials shall be compatible with one another and

adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

2.4 THERMOPLASTIC MEMBRANE MATERIALS

A. KEE Roof Membrane:

1. Thermoplastic Ketone Ethylene Ester (KEE) coated polyester fabric-reinforced fleece-backed sheet, ASTM D6754 .

    a. Basis of design product: Tremco, TremPly KEE FB Single Ply Roof Membrane.
    b. Breaking Strength, minimum, ASTM D751: Machine direction, 500 lbf (87 kN/m); Cross machine direction 400 lbf (70 kN/m).
    c. Tear Strength, minimum, ASTM D751: Machine direction, 125 lbf (22 kN/m); Cross machine direction (145 lbf (25 kN/m).
    d. Elongation at Break, ASTM D751: 20 percent.
    e. Dynamic Impact/Puncture Resistance, ASTM D5635: Pass.
    f. Minimum Membrane Thickness, nominal, less backing, ASTM D751: 60 mils (1.5 mm).
    g. Thickness over fiber, optical method: 0.016 inches.
    h. Accelerated Weathering, ASTM G155 and ASTM G154: Not greater than 5,000 hr., no cracking or crazing.
    i. Abrasion Resistance, ASTM D3389: Not greater than 2,000 cycles, H-18 wheel, 1,000 g load.
    j. Color: Grey.

B. Sheet Flashing: Manufacturer's standard, smooth-backed, sheet flashing of same material, type, reinforcement, thickness and color as KEE roof membrane.

2.5 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.
2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Membrane Bonding Adhesive:

1. Bonding adhesive, waterborne low-VOC, for bonding KEE fleece-backed single ply membranes and flashings to substrates.

    a. Basis of design product: Tremco, TremPly KEE FB WBII Bonding Adhesive.
    b. VOC, maximum, ASTM D3960: 153 g/L.

C. Flashing Membrane Adhesive:

1. Bonding adhesive, solvent based fast drying, VOC-compliant, for bonding KEE smooth-backed single ply membranes and flashings to substrates.

a. Basis of design product: Tremco, TremPly KEE LV Bonding Adhesive.
b. VOC, maximum, ASTM D 3960: 200 g/L.

D. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 mm by 3 mm) thick; with anchors.

E. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening components to substrate, and acceptable to membrane roofing system manufacturer.

F. Joint Sealant: Elastomeric joint sealant compatible with roofing materials, with movement capability appropriate for application.

1. Joint Sealant, Polyurethane: ASTM C920, Type S, Grade NS, Class 50 single-component moisture curing sealant, formulated for compatibility and use in dynamic and static joints; paintable.

a. Basis of design product: Tremco, TremSEAL Pro.
b. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 40 g/L.
c. Hardness, Shore A, ASTM C661: 40.
d. Adhesion to Concrete, ASTM C794: 35 pli.
e. Tensile Strength, ASTM D412: 350 psi (2410 kPa).
f. Color: White.

G. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, and other accessories.

2.6 ROOF INSULATION MATERIALS

A. General: Preformed roof insulation boards manufactured or approved by roofing manufacturer, selected from insulation manufacturer's standard sizes, suitable for application, and of thicknesses indicated.

B. Roof Insulation: Provide roof insulation product in thicknesses indicated in Part 3 as follows:

1. Board Insulation, Polyisocyanurate: CFC- and HCFC- free, with recycled content glass-fiber mat facer on both major surfaces, ASTM C1289 Type II Class 1.

a. Basis of design product: Hunter Insulation.
b. Compressive Strength, ASTM D1621: Grade 2: 20 psi (138 kPa).
c. Conditioned Thermal Resistance at 75 deg. F (24 deg. C): 14.4 at 2.5 inches (50.8 mm) thick.

2.7 ROOF INSULATION ACCESSORIES

A. Cover Board:

1. Gypsum panel, cellulosic fiber reinforced, water-resistant, ASTM C1278/C1278M.

a. Basis of design product: USG Securock.
b. Thickness: 1/2 inch (13 mm).

B. Roof Cover Board Adhesive:

1. Urethane adhesive, bead-applied, low-rise two-component solvent-free low odor, formulated to adhere roof insulation to substrate.

a. Basis of design product: Tremco, Low Rise Foam Insulation Adhesive.
b. Flame Spread Index, ASTM E84: 10.
c. Smoke Developed Index, ASTM E84: 30.
d. Volatile Organic Compounds (VOC), maximum, ASTM D3960: 0 g/L.
e. Tensile Strength, minimum, ASTM D412: 250 psi (1720 kPa).
f. Peel Adhesion, minimum, ASTM D903: 17 lbf/in (2.50 kN/m).
g. Flexibility, 70 deg. F (39 deg. C), ASTM D816: Pass.

C. Insulation Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation and cover boards to substrate, and acceptable to roofing system manufacturer.

D. Air Vent/Vapor Extractor: Supply and installation of Italprofili Air Vent/Vapour extractor or similar. Made of UV stabilized KEE or compatible, complete with anti-insect and protection ring for ventilation of vapors between the substructure and the membrane.

2.8 WALKWAY MATERIALS

A. Walkway Material:

1. Walkway roll, reinforced PVC/TPA membrane roll with serrated slip-resistant surface, fabricated for heat welding to compatible PVC/TPA membrane surface.

a. Basis of design product: Tremco, TPA Walkway Roll.
b. Roll Size: 36 inches by 60 foot (914 mm by 18.3 m).
c. Thickness / Color: Gray, 0.072 inch (2 mm).
d. Tensile, Grab ASTM D751: 200 lbf (890 N).
e. Tear Strength, Tongue : 45 lbf (200N).
f. Low Temp Flex: -40 deg F. (-40 deg C.).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood cants, blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Existing Prepared Roof Substrate: Verify that existing insulation and substrate is sound and dry. Refer to requirements of Division 07 Section "Preparation for Re-Roofing."
4. Lightweight Insulating Concrete Roof Deck: Verify that deck is sound and dry and securely fastened with no projecting fasteners and with no adjacent units in excess of 1/16 inch (1.6 mm) out of plane relative to adjoining deck.
5. Verify that existing insulation and substrate is sound and dry.

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

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.
B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.
C. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 INSTALLATION, GENERAL

A. Install roofing system in accordance with manufacturer’s written instructions and approved details.
B. NRCA Installation Details: Install roofing system in accordance with applicable NRCA Manual Plates and NRCA recommendations; modify as required to comply with manufacturer's approved details and perimeter fastening requirements of FM Global references if applicable.

3.4 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.
B. Install insulation at wet insulation removal areas to match existing roof thickness. Where overall insulation thickness is 2.7 inches (70 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
C. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.
D. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck through the lightweight insulating concrete using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

E. Cover Boards: Install cover boards over insulation and existing built-up roof system with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together.

1. Secure cover boards to resist uplift pressure at corners, perimeter, and field of roof.
2. Adhere cover boards by setting in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining cover board in place.

3.5 ADHERED MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing and install according to membrane roofing system manufacturer's written instructions.
B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.
C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
D. Water-Based Bonding Adhesive: Apply to substrate at rate required by manufacturer. Install membrane immediately into adhesive, avoiding any air entrapment; do not allow adhesive to dry. Roll membrane into wet adhesive. Do not apply adhesive to splice area of membrane.
E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeter of roofing.
F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.
G. Welded Seams: Clean seam areas, overlap membrane roofing, and hot-air weld side and end laps of membrane roofing and sheet flashings according to manufacturer's written instructions to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of sheet membrane.
2. Verify field strength of seams a minimum of twice daily and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

H. Spread sealant bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.
I. Install membrane roofing and auxiliary materials to tie in nightly to existing roofing to maintain weathertightness of transition.

3.6 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.
B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld

side and end laps to ensure a watertight seam installation.

E. Seal top termination of base flashing with a metal termination bar and a continuous bead of joint sealant.

3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

A. Roofing Manufacturer: Manufacturer to provide site visits 2-3 days per week for the project duration. Provide written reports with photos and distribute to the project stakeholders.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

3.9 PROTECTING AND CLEANING

A. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

B. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 08 63 00
METAL FRAMED SKYLIGHTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Metal Framed Structural Skylights.
B. Related Sections may include, but are not limited to the following:
   1. Division 7 Section “Joint Sealants” for sealants installed at metal-framed skylight perimeters.
   2. Division 8 Section “Glass and Glazing”

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide metal-framed skylights capable of withstanding loads and thermal and structural movements indicated without failure. Failure includes the following:

   1. Deflection exceeding specified limits.
   2. Thermal stresses transferred to the building structure.
   3. Skylight framing members transferring stresses, including those caused by thermal and structural movement, to glazing.
   4. Weakening of fasteners, attachments, and other components.

B. Deflection Limits: As follows:

   1. Deflection of the entire length of framing members in direction normal to glazing plane is limited to 1/175 of clear span.

C. Lateral Support: Compression flanges 75% of flexural members requiring lateral be laterally braced by cross members with minimum depths equal to flexural member depth and by anchors to the building structure. Glazing material does not provide lateral support.
D. Structural Loads: Provide metal-framed skylights, including anchorage, capable of withstanding the effects of the following service level design loads when supporting full dead loads:

   1. Roof Loads

      a. Concentrated Load: 250 lbs applied to framing members at location that produces the most severe stress or deflection.
      b. Roof Live Loads: 20 lb/ sq. ft
      c. Wind Loads: 46 lb/ sq. ft (uplift)

   2. Seismic Loads: 45% of assembly weight (in-plane of skylight), 15% of assembly weight (out-of-plane of skylight).

E. Structural Performance: Provide metal-framed skylights, including anchorage, capable of withstanding pressures indicated without material and deflection failures and permanent deformation of structural members exceeding 0.2 percent of span when tested according to ASTM E 330.
F. Air Infiltration: Provide metal-framed skylights with maximum air leakage of 0.06 cfm/sq. ft. (0.03 L/s per sq. m) of surface when tested according to ASTM E 283 at a minimum static-air-pressure differential of 6.24lb/sq. ft. (300 Pa).
G. Water Penetration: Provide metal-framed skylights that do not evidence water penetration when tested according to ASTM E 331 at a minimum differential static pressure of 20 percent of positive design wind pressure, but not less than 15 lb/sq. ft. (718 Pa).
H. Condensation Resistance: Provide aluminum-framed systems that when tested with fixed glazing, have a frame condensation-resistance factor (CRF) of not less than 54 when tested according to AAMA 1503 when clear over clear insulated glass is used.

I. Thermal Movement: Provide metal-framed skylights that allow for thermal movements resulting from the following maximum change (range) in ambient temperatures by preventing buckling, sealant failure, and other detrimental effects.

1. Temperature Change (Range): 100 degrees F.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions and profiles of components, and finishes for metal-framed skylights.
B. Shop Drawings: For metal-framed skylights. Include plans, elevations, sections, details, and attachments to other work as required.
C. Samples for Initial Selection: Manufacturer’s color charts consisting of sections of units showing the full range of colors available for factory-finished aluminum.
D. Samples for Verification: Provide color sample of selected finish on 2"x3" aluminum sheet.
E. Installer Certificates: If required, signed by manufacturer certifying that installers comply with requirements.
F. Product Test Reports: From a qualified testing agency indicating skylights comply with requirements, based on comprehensive testing of current products.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing metal-framed skylights similar to those indicated for this Project and who is acceptable to manufacturer.
B. Professional Engineer Qualifications: A professional engineer who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of skylights that are similar to those indicated for this Project in material, design, and extent.
C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E 548.

1.7 PROJECT CONDITIONS

A. Field Measurements: Where metal-framed skylights are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
    1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating skylights without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.8 WARRANTY

A. Warranty: Written warranty, executed by manufacturer agreeing to repair or replace components of metal-framed skylights that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, the following:
    1. Structural failures.
    2. Failure of systems to meet performance requirements.
    3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
    4. Water leakage; defined as uncontrolled water appearing on normally exposed interior surfaces of skylights from sources other than condensation, resulting from defects in skylight materials or workmanship. (Water controlled by flashing and gutters and drained back to the exterior and that cannot damage adjacent materials or finishes is not water leakage). Water leakage resulting from improper installations not part of this warranty.
B. System Warranty Period: 5 years from date of shipment from the manufacturer.
C. Finish Warranty: Provide written warranty signed by manufacturer agreeing to repair or replace work with finish defects. “Defects” is defined as peeling, chipping, chalking, fading, abnormal aging or deterioration, and failure to perform as required.
    1. Warranty Period for Anodized Finish: 1 year from date of shipment from the manufacturer.
    2. Warranty Period for Powder Coat Finish: 5 years from date of shipment from the manufacturer.
    3. Warranty Period for Kynar 500 Finish: 5 years from date of shipment from the manufacturer. (10 and 20 years available if specified).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide Pinnacle 350 system by Wasco Products, Inc., Commercial Division, Wells, ME (800-388-0293)

B. Contact Info: Matthew Vizcarra, Apollo Architectural
Phone: 707-238-5005
Fax: 707-238-5158
Email: matthew@apolloarchitectural.net
Web: http://apolloarchitectural.net/

C. Substitutions: Manufacturers shall not be considered without prior approval in writing no later than ten (10) calendar days prior to bid. Substitute manufacturers must have been in the custom skylight business for not less than a period of 15 years and must submit to the Architect the following:
1. List of similar projects successfully completed within the last five years.
2. Proof of financial capability.
3. Complete details of proposed skylight.
4. Complete specifications for Architect's review.

2.2 FRAMING MATERIALS

A. Framing Members: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.109 inches.
B. Exterior Pressure Caps: Extruded aluminum alloy 6063-T5 or T6, ASTM B 221 with minimum effective thickness of 0.090 inches.
C. Concealed Flashing: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding flashing; compatible with adjacent materials.
D. Exposed Flashing and Closures: Aluminum sheet alloy and temper of 1100-H14, thickness as require for proper performance.
1. Minimum Thickness: 0.032 inch Apron Flashing.
2. Minimum Thickness: 0.062 inch Closures.
E. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, non-staining, non-bleeding fasteners and accessories; compatible with adjacent materials.
1. Aluminum Retaining Cap Fasteners and Framing Members Fasteners: ASTM A 193/A 193M, Series 300 stainless-steel screws; type as recommended by manufacturer.
2. Connections to Supporting Structure: Series 300 Stainless Steel or ASTM A 307, hot dipped galvanized steel fasteners by installer.
F. Framing-System Sealants: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
2. Sealant conforms to USDA approval standards.
G. Bituminous Paint: Cold-applied asphalt mastic paint complying with SSPC-Paint 12, except containing no asbestos, and formulated for 30-mil thickness per coat.

2.3 GLAZING MATERIALS

A. Sloped Glass: Single glazed system with 9/16” white laminated glass.
B. Glazing shall comply with 2022 CBC Section 2405.2 – Sloped Glazing and Skylights
C. Refer to Specification Section 08 80 00 Glazing for additional info.
    1. Glass must meet the requirements of the AAMA Glass Design for Sloped Glazing for the project.
D. Glazing Gaskets: Manufacturer’s proprietary pressure-glazing gaskets of elastomer type and hardness selected by the skylight manufacturer to comply with requirements. Glazing gaskets to be extruded thermoplastic elastomer by the skylight manufacturer.
E. Spacers, Edge Blocks, and Setting Blocks: Manufacturer’s standard permanent non-migrating type of elastomer type and hardness selected to comply with requirements. Spacers, Edge Blocks, and Setting Blocks to be extruded thermoplastic elastomer by the skylight manufacturer.
F. Glazing Weatherseal Sealant: Neutral-curing silicone sealant recommended by skylight and sealant manufacturers for this use and furnished by skylight manufacturer.
    1. Sealant is capable of withstanding 50 percent movement in both extension and compression (total of 100 percent movement) when tested for adhesion and cohesion under maximum cyclic movement according to ASTM C 719.
    2. Sealant complies with ASTM C 920 for Type S, Grade NS, Class 25, Uses NT, G, A, and, as applicable to substrates including other sealants with which it comes in contact, O.
    3. Color: Black.
G. Flashing Sealant: Single-component, non-sag, high performance, non-priming, gun-grade elastomeric polyurethane sealant furnished by skylight manufacturer.
    1. Sealant complies with ASTM C920, Type S, Grade NS, Class 25, Use T, NT, M, A, G, and O. Canadian Specification CAN/CGSB-19.13-M87, Classification MCG-2-25-A-N.
    2. Sealant conforms to USDA approval standards.

2.4 FABRICATION

A. Framing Components: As follows:
    1. Factory fit and assemble components, where practical.
    2. Fabricate components that, when assembled, will have accurately fitted joints with ends coped or mitered to produce hairline joints free of burrs and distortion.
    3. Fabricate components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
    4. Fabricate components to accommodate expansion, contraction, and field adjustment, and to provide for minimum clearance and shimming at skylight perimeter.
    5. Fabricate components to ensure that glazing is thermally and physically isolated from framing members.
    6. Form shapes with sharp profiles, straight and free of defects or deformations, before finishing.
    7. Fit and assemble components to greatest extent practicable before finishing.

8. Reinforce members as required to retain fastener threads.
9. Attach retainer bars with gasketed stainless steel fasteners spaced at a maximum of 12 inches on center.
10. Weld components before finishing and in concealed locations to greatest extent practicable to minimize distortion.
11. Before shipping, shop assemble, mark, and disassemble components that cannot be permanently shop assembled.

B. Provide continuous aluminum frame with weatherproof splice joints and locked and sealed or fully welded corners. Locate weep holes in the frame at each rafter connection to drain condensation.
C. Prepare framing to receive anchor and connection devices and fasteners.
D. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer's recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners.

2.5 LUMINUM FINISHES

A. General: Comply with NAAMM "Metal Finishes Manual" recommendations for application and designations of finishes.
B. Finish designations prefixed by AA conform to the system for designations of aluminum finishes established by the Aluminum Association.
    1. Mill Finish: Manufacturer's standard mill finish.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting skylight performance.
    1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Metal Protection: As follows:
    1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
    2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
    3. Where aluminum will contact pressure-treated wood, separate dissimilar materials by methods recommended by manufacturer.

3.3 INSTALLATION

A. General: Comply with manufacturer's written instructions for protecting, handling, and installing skylight components.
    1. Fit frame joints to produce hairline joints free of burrs and distortion.

2. Rigidly secure non-movement joints.
3. Accommodate thermal and mechanical movements.
4. Install framing components to drain water passing joints and to drain condensation and moisture occurring or migrating within skylight system to the exterior.
5. Coordinate installation of flashings at skylight perimeters to maintain continuity of water barriers.
6. Set continuous curbs and flashings in a full sealant bed, unless otherwise indicated. Comply with requirements in Division 7 Section “Joint Sealants.”

B. Erection Tolerances: Install skylight components true in plane, accurately aligned, and without warp or rack. Adjust framing to comply with the following tolerances:
   1. Variation from Plane: Limit variation from plane or location shown to 1/8 inch in 10 feet; 1/4 inch over total length.
   2. Alignment: Where surfaces abut in line and at corners and where surfaces are separated by less than 3 inches, limit offset from true alignment to less than 1/32 inch; otherwise, limit offset from true alignment to 1/8 inch.

C. Field Glazing: Locate and size extruded elastomeric setting blocks and spacers in accordance with the glazing manufacturer’s recommendations. At no point shall the glazing come in contact with the skylight frame or fasteners

D. Install secondary-sealant weatherseal according to sealant manufacturer’s written instructions to provide weatherproof joints. Install joint fillers behind sealant as recommended by sealant manufacturer.

3.4 CLEANING

A. Clean skylights inside and outside, immediately after installation and after sealants have cured, according to manufacturer’s written recommendations.
   1. Remove temporary protective coverings and strippable coatings from pre-finished metal surfaces. Remove labels and markings from all components.

B. Remove excess sealant according to sealant manufacturer’s written recommendations.

END OF SECTION 08 63 00

SECTION 08710
FINISH HARDWARE

PART I - GENERAL

1.01 DESCRIPTION

A. Scope: Work under this Section shall include all materials and installation necessary to provide Finish Hardware as shown and detailed on the Drawings and specified herein.

1.02 QUALITY ASSURANCE

A. References:

1. General: Satisfy current applicable fire, building and accessibility codes and rules.

2. Accessibility Standards:

a. General: ANSI A117.1 and the California Building Code section 11-B

b. Americans with Disabilities Act (ADA): Standards

3. National Fire Protection Association (NFPA): NFPA 80, 101, and 252

4. American Woodwork Institute (AWI): Quality Standards

5. Underwriters Laboratories: UL 10B and 305

1.03 QUALIFICATIONS:

A. Supplier:

1. General: A firm specializing in the supply and servicing of institutional and commercial door hardware for at least five (5) years.

1.04 SUBMITTALS

A. Hardware Schedule:

1. General: Submit completely detailed finish hardware schedule in vertical format. Reference headings to hardware groups specified and clearly indicate door type, or mark, describe its location, hand, size, door and frame material, and fire rating, if applicable. Organize all doors with the exact same hardware group under one heading, either per building, or per project. If per project, list doors per building in numerical order.

2. Non-Acceptance: Coded, or keyed hardware scheduling, creating a separate heading for every door and requiring reference to master lists of products is not acceptable, and will be rejected without review.

B. Manufacturers List:

1. General: List manufacturer's names and product numbers for items used in hardware schedule to facilitate checking for compliance.

2. Product Source: Furnish each type of lock and latchset from a single manufacturer, unless more than one manufacturer's products are specified

3. Substitutions: Refer to Division 1, Section 01610 – Product Requirements. If substitutions are offered, list both the specified product and the proposed substitution.

a. Samples:

1) General: Submit, with hardware schedule, physical sample of each item proposed to be substituted for specified item.

2) Label: Clearly mark each sample to indicate name of item, brand name, manufacturer's catalog number and item for which it is proposed to be substituted.

3) Disposition: Approved samples may be used in work; rejected samples will be returned.

1.05 PRODUCT HANDLING

A. General: Refer to Division 1, Section 01310 – Coordination.

B. Packaging: Mark all materials so as to identify door number, hardware type, location and hand of door

C. Keys: Label and deliver all keys to University's Representative.

D. Coordination:

1. General: Hardware applied to aluminum or metal doors and frames and factory prepared wood doors and frames shall be made to template; provide two copies of approved finish hardware schedule for use by door and frame suppliers.

2. Distribution: Furnish two copies of each template to those manufacturers who are not listed as current registered template book holders; furnish two copies of each template for items whose manufacturers do not provide registered template book.

1.06 MAINTENANCE

A. Guarantee:

1. General: Provide in required form for a period of one (1) year from date of final acceptance by University.

2. Door Closers: Twenty-five (25) years.

3. Exit Devices: Five (5) years.

PART II - PRODUCTS

2.01 MATERIALS

A. SPECIFIED PRODUCTS AND ACCEPTABLE MANUFACTURERS Catalog numbers used below are those of the following specified manufacturers. Acceptable alternate manufacturers are as listed; items produced by acceptable manufacturers, comparable to those specified in material, weight, size, function, design and finish will be considered accepted equals to those items specified and will not require submittal of physical sample or request for substitution. Any other manufacturers other than those listed as "Specified" or "Acceptable Manufacturer" will be considered as "or equal" subject to requirements for substitution requests or required by Division 1. University's Representative's decision regarding any item submitted for approval as equal to that specified shall be final.

Product	Specified	Acceptable Manufacturers
Hinges	Hagar	Stanley; Ives
Special control hinges	Rockford Process	No known equal
Interior Doors (Locks & Cylinders)	Schlage "ND" series	No known equal
Exterior Doors (Locks & Cylinders)	Schlage Primus L series	No known equal
Closers	LCN 4040	Dorma; Yale
Floor/Wall Stops	Glynn Johnson	Brass; Quality
Exit Devices	Von Duprin	No known equal
Astragals	Pemco	National Guard; Zero
Thresholds and Weatherstrip	Pemco	National Guard; Zero
Silencers	Brass	Quality; Signature
Trim	Signature Brass	Door Controls Int'1; Quality
Overhead Stops and Holders	Glynn-Johnson	Rixon; Sargent
Flush Bolt Coordinators	Ives	No known equal
Electronic Strikes	Von Duprin 6100/6300 series	No known equal
Electronic Locksets	Schlage L9080 series/ND 96 series	No known equal
Electromagnet Holders	LCN	Rixon
Electromagnet Locks	SDE	Locknetics
Bifold Hardware	Grant	Haefele; L.E. Johnson
Key Cabinet	Door Controls Intl.	H.B.Ives; Telkee; Lund; Key Control Systems, Inc.

Key Cabinet:

B. Manufactured Units:

1. Locks:

a. General: Provide wrought boxes for strikes.

b. Keys: Furnish three (3) uncut blanks for each lockset, in keyways to match project system.

2. Closers: Key valve type or screw type; furnish one key for each five (5) closers. Fasten with four (4) sex bolts per closer. Provide 180º opening where indicated.

Provide parallel arms with jamb attachment for all out-swinging doors. Supply drop plates at narrow top rail doors, as required.

3. Screws, Bolts, and Fastening Devices: Exposed head oval Phillips type in countersunk holes, unless otherwise specified or required. Use screws, bolts, washers, grommets, nuts, and other fastening devices of appropriate length, type, head, metal and finish, as necessary for proper match and application of hardware. See Division 5, Section 05500 – Miscellaneous Metal Fabrications.

4. Fire Rated Doors: Equip fire rated doors with UL listed hardware meeting requirements of CBC Chapter 43 and Fire Protection Equipment list of Underwriters Laboratories, Inc.

5. Padlock: Schlage PL4741 padlock or equal keyed as directed for roof hatches, gates, traffic barrier bollards and roof access ladder security covers.

6. Thresholds: Provide all thresholds, door bottoms and seals as specified, or detailed. Provide thresholds with non-standard custom-drilled screw holes where details indicate this requirement.

7. Butt Hinges:

    a. General Locking reverse bevel doors shall be furnished with NRP feature butts. All doors with closers shall be furnished with ball, or oilite bearing butts.

    b. Exterior: Butts for reverse bevel exterior doors shall be of equivalent model listed, but shall be of nonferrous metal.

    c. Size: Unless otherwise specified, the size of the butts will be determined by the following rules:

        1) Doors 1-⅜” thick and up to 2’-4" wide: 3-½” butts.

        2) Doors 1-⅜” inch thick over 2’-4" to 3’-0" Wide: 4” butts.

        3) Doors 1-¾” thick up to 3’-0" wide: 4-½” butts.

        4) Doors 1-¾” thick over 3’-0" wide: 5” butts.

        5) Note: All butts shall be of proper width to clear trim in projection to allow 180º swing and that width shall be determined by the following rules:

        6) For doors up to 2-¼” thick: twice the door thickness, plus trim projection, less ½”, equals the proper hinge width. For doors 2-¼” to 3” thick: twice the door thickness, plus trim projection, less ¾” equals the proper hinge width. Furnish three butts for each door

leaf up to 7’-0" high. Furnish an additional butt for each 2’-0" of door height over 7’-0".

2.02 KEYING

A. General: All keyed locks shall have temporary cylinders or plugs during construction. Provide following:

1. Grand Master Key System:

a. General: Key to University's existing Primus Controlled Access Grand Master Key System; provide six (6) cut GMK and six (6) cut Master Keys per set; allow for four (4) Master Key sets.

b. Keying: All final keying to be performed by UCDMC Lock Shop. Deliver interior and exterior cylinders to University's Representative for final re-keying.

2. Key Control System: Visual; stamp keys with key set symbols.

3. Construction Master Key System: Furnish twenty (20) construction master keys, and four (4) extractor keys.

4. Change Keys: Three (3) standard bow change keys per cylinder.

2.03 FINISHES

A. General: Provide finishes as follows, unless otherwise indicated:

Hinges:	Exterior 630 (32D);
Interior	652 (26D)
Locks:	626 (26D)
Closers:	689 (Aluminum finish)
Floor Closers:	626 (26D)
Stops:	626 (26D)
Exit Devices:	626 (26D)
Thresholds/Weatherstripping:	628 (28)
Trim:	626 (26D)
Protection Plates:	63G (32D)
Special Items:	As Noted
Key Cabinet:	Manufacturer’s standard

PART III - EXECUTION

3.01 APPLICATION

A. General: Install in strict conformance with referenced standards, the manufacturer’s written directions, as shown, and as herein specified.

B. Floor Clearances: Unless detailed otherwise on Drawings, provide following clearances:

1. Labeled Doors: ⅜” maximum over floor or threshold.

2. No Threshold: ¾” maximum for metal doors; ⅝” maximum for wood doors.

3. Threshold: ⅛" typical.

4. Carpet: ⅛" over top of nap, unless otherwise shown.

C. Hardware Placement: Except for hinges, do not install hardware until completion of painting and finishing work. Unless detailed otherwise, place hardware at following height above finish floor:

1. Strike (Centerline) for Locks and Latches: Between 40" and 42".

2. Hinges: Manufacturer's standard.

3. Door Pull (Centerline): 42".

4. Push Plate (Centerline): 44".

5. Deadlocks (Centerline of Cylinder): 44".

D. Installation:

1. General: Install hardware in precise manner; door clearance and hardware placement as specified. Predrill pilot holes in wood for screws. Drill and tap for surface mounted hardware on metal.

2. Hinges: Set hinge leaves snug and flat in mortises; turn screws to flat seat (do not drive). Drive hinge pins down and tighten setscrews.

3. Closers: Mount door closers for maximum swing of door before setting stops.

4. Silencers: Set in place before adjusting strikes.

5. Locksets: Install locks with keyways in proper position, and levers, roses and escutcheons firmly affixed.

6. Thresholds: Set in waterproof sealant and secure with lead shields and countersunk screws of same finish as threshold. In heavy traffic areas use Hilti Countersunk Kwik Bolt II, size dependant on height of threshold, or equal.

E. Reinstallation Of Existing Doors:

1. General: Remove existing doors noted to have swing reversed, alter door and hardware as required, and reinstall door with new swing as indicated.

2. Hardware: Provide new hardware where existing cannot be altered to suit new conditions. New hardware, when required, of quality specified herein and function to match that of existing door.

3.02 ADJUSTMENT AND MAINTENANCE

A. General: Prior to acceptance, adjust all moveable parts to assure smooth operation.

B. Door Closers: Adjust for closing speed, latching speed, back checking, and adjust hold-open devices for full control of door. Maximum effort to operate doors shall not exceed 5.0 lbs. for exterior doors, 5.0 lbs. for interior doors, and 15 lbs. for fire doors.

3.03 CLEANING

A. General: Upon completion, thoroughly clean all exposed surfaces per manufacturer's instructions.

END OF SECTION 08710

SECTION 08 80 00
Glazing

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Glass and glazing for hollow metal work and doors.

1.2 SECTION EXCLUDES

A. Factory glazing of aluminum windows.

1.3 REFERENCES

A. ANSI Z97.1 - Safety Performance Specifications and Methods of Test for Safety Glazing Used in Buildings.

B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants.

C. ASTM C1036 - Standard Specification for Flat Glass.

D. ASTM C1048 - Standard Specification for Heat Strengthened and Fully Tempered Flat Glass.

E. ASTM C1172 – Standard Specification for Laminated Architectural Flat Glass.

F. GANA - Glazing Manual (50th Edition) and Sealant Manual (2008 Edition).

G. UL - Underwriters' Laboratories, Inc., Building Materials Directory.

1.4 QUALITY ASSURANCE

A. Conform to Glass Association of North America (GANA) Glazing Manual and Sealant Manual for glazing installation methods.

1.5 SUBMITTALS

A. Submit under provisions of Section 01 33 00.

B. Product Data: Provide structural, physical and environmental characteristics, size limitations, and special handling or installation requirements for glass. Provide data on glazing sealant. Identify colors available.

C. Submit two 12" square Samples, illustrating each glass coloration.

D. Submit 12" long bead of glazing sealant in color selected.

E. Submit sealed glass unit manufacturer's certificate indicating units meet or exceed specified requirements.

1.6 DELIVERY, STORAGE, AND PROTECTION

A. Deliver, store and protect products under provisions of Section 01 87 00.

1.7 WARRANTY

A. Provide manufacturer's warranty against defects in material, including loss of hermetic seal insulating units, for a period of 5 years after date of Substantial Completion.

B. Include coverage for reflective coating on mirrors and replacement of same.

C. Include coverage for delamination of laminated glass and replacement of same.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Tempered Glass:

1. Guardian Industries Corp., www.guardian.com
2. Ford Glass Division.
3. Pilkington Glass Ltd., www.pilington.com
4. Vitro Architectural Glass., www.vitroglazings.com
5. HGP and Affiliates Inc., hyperformanceglassproducts.com
6. AGC Industries, Inc., www.agcglass.com
7. Spectrum Glass Products, Inc.
8. Oldcastle Building Envelope., obe.com
9. Viracon, Inc., www.viracon.com

B. Substitutions: Under provisions of Section 01 62 00.

2.2 GLASS MATERIALS, GENERAL

A. Primary Glass Standard: Comply with ASTM C1036 requirements, including reference to type, class, quality, and, if applicable, form, finish, mesh and pattern.

B. Laminated Glass Standard: Comply with ASTM C1172 requirements including reference to type, class, quality and if applicable, form, finish and pattern.

C. Tempered Glass Standard: Comply with ASTM C1048 requirements, including those indicated by reference to kind, condition, type, quality, class, and, if applicable, form, finish,

and pattern.

D. Visual Light Transmission and Heat Gain: Conform to requirements indicated.

E. Sizes: Fabricate glass to sizes required for glazing openings, with edge clearances and tolerances complying with recommendations of glass manufacturer and GANA.

F. Provide thicknesses indicated or, if not indicated, as recommended by glass manufacturer for application indicated.

2.3 PRIMARY GLASS PRODUCTS

A. Clear Float Glass: ASTM C1036, Type I transparent glass, flat, Class 1 clear, Quality q3. Low E coating on No. 2 surface of exterior glass.

2.4 TEMPERED GLASS PRODUCTS

A. Manufacturing Process: Horizontal (roller hearth) process with roll wave distortion parallel with bottom edge of glass as installed.

B. Clear Tempered Float Glass: ASTM C1048, Kind FT fully tempered, Condition A, Type 1 transparent glass, flat Class 1 clear, Quality q3; conforming to ANSI Z97.1.

C. Clear Tempered Float Glass - Low E: ASTM C1048, Kind FT fully tempered, Condition C coated with low E coating on No. 2 surface, Type 1 transparent glass, Class 1 clear, Quality q3; conforming to ANSI Z97.1.

D. Skylight Glass should meet a Max U-Factor of 0.58, Max SHGC of 0.25, Min BT of 0.49 and Max SRR% of 5%.

2.5 GLAZING SEALANTS AND PREFORMED GLAZING TABS

A. General: Comply with ASTM C920, and sealant and glass manufacturers' recommendations for suitability and compatibility.

B. One-Part Butyl Glazing Sealant:

1. Bostik Construction Products Div., www.bostik-us.com
2. Norton Performance Products., www.nortonabrasives.com
3. "BC 158"; Pecora Corp., www.pecora.com
4. "757 Butyl Sealant"; or approved equal

C. One-Part Acid-Curing Silicone Glazing Sealant: Type S; Grade NS; Class 25:

1. Bostik Construction Products Div., www.bostik.com
2. " Dowsil 999A Silicone Glazing Sealant"; Dow Corning Corp., www.dow.com
3. "SCS2000"; General Electric Corp., siliconeforbuilding.com

4. Pecora Corp., www.pecora.com

5. Sanofi, www.sanofi.com healthcare

6. Master Builders Solutions, www.master-builder-solutions.com

7. "Proglaze®"; Tremco.

D. Preformed Butyl-Polyisobutylene Glazing Tape With Spacer Rod:

1. "Chem-Tape 60";

2. "Shim-Seal";

3. Tremco® 440 Tape"; Tremco Inc., www.tremcosealants.com

2.6 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene; EPDM or silicone blocks, 80-90 Shore A durometer hardness.

B. Spacer Shims: Neoprene; EPDM or silicone blocks, Shore A durometer hardness; self-adhesive one face.

C. Glazing Gasket: Resilient polyvinylchloride extruded shape to suit glazing channel retaining slot with prefabricated molded corners. Color to be selected by Architect from manufacturer's full range of colors.

D. Glazing Clips: Manufacturer's standard type.

E. Mirror Attachment Accessories: Mirror adhesive, chemically compatible with mirror coating and wall substrate.

PART 3 - EXECUTION

3.1 INSPECTION

A. Verify surfaces of glazing channels or recesses are clean, free of obstructions, and ready for Work of this Section.

B. Beginning of installation means acceptance of substrate.

3.2 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses.

C. Prime surfaces scheduled to receive sealant.

3.3 EXTERIOR COMBINATION METHOD (TAPE AND SEALANT AT STEEL FRAMES)

A. Cut glazing tape to length and set against permanent stops, 3/16" below sightline. Seal corners by butting tape and dabbing with butyl sealant.

B. Apply heel bed of butyl sealant along intersection of removable stop with frame ensuring full seal between glass and frame.

C. Place setting blocks at 1/4 points with edge block no more than 6" from corners.

D. Rest glass on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane.

E. Install removable stops with spacer strips inserted between glass, and applied stops at 24" intervals, 1/4" below sightline.

F. Fill gap between pane and removable stop with silicone sealant to depth equal to bite of frame on pane, but not more than 3/8" below sightline.

G. Apply cap bead of silicone sealant along exterior void, to uniform line, flush with sightline. Tool or wipe sealant surface with solvent for smooth appearance.

3.4 CLEANING

A. After installation, mark pane with an "X" by using plastic tape or removable paste.

B. Remove glazing materials from finish surfaces.

C. Remove labels after Work is completed.

END OF SECTION

SECTION 09900
PAINTING

PART I - GENERAL

1.01 RELATED DOCUMENTS

A. Scope: Work under this Section shall include all materials and installation necessary to provide Painting including: exposed exterior items and surfaces, surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections as shown and detailed on the Drawings and specified herein.

B. Paint exposed surfaces, except where the paint schedules indicate that a surface or material is not to be painted or is to remain natural. If the paint schedules do not specifically mention an item or a surface, paint the item or surface the same as similar adjacent materials or surfaces whether or not schedules indicate colors. If the schedules do not indicate color or finish, the Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and ironwork, and primed metal surfaces of mechanical and electrical equipment.

C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.

1. Prefinished items include the following factory-finished components:

a. Finished mechanical and electrical equipment

2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:

a. Pipe spaces

b. Duct shafts

3. Finished metal surfaces include the following:

a. Anodized aluminum

b. Stainless steel

c. Chromium plate

d. Copper

e. Bronze and brass

4. Operating parts include moving parts of operating equipment and the following:

a. Valve and damper operators

b. Linkages

c. Sensing devices

d. Motor and fan shafts

5. Labels: Do not paint over Underwriters Laboratories (UL), Factory Mutual (FM), or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.

D. Related Sections include the following:

1. Division 5 Section 05500 "Miscellaneous Metal Fabrications" for shop priming ferrous metal.

2. Alternates: Refer to Division 1 Section "Alternates" for description of Work in this Section affected by alternates.

1.02 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 10 when measured at an 85º meter.

2. Eggshell refers to low-sheen finish with a gloss range between 10 to 15 when measured at a 60º meter.

3. Satin refers to low-sheen finish with a gloss range between 30 to 35 when measured at a 60º meter.

4. Semi-gloss refers to medium-sheen finish with a gloss range between 50 to 55 when measured at a 60º meter.

5. Full gloss refers to high-sheen finish with a gloss range more than 75 when measured at a 60º meter.

1.03 SUBMITTALS

A. Product Data: For each paint system specified. Include block fillers and primers.

1. Material List: Provide an inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

2. Manufacturer's Information: Provide manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material proposed for use.

3. Certification by the manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOCs).

B. Samples for each color selection verification; of each color and material to be applied, with texture to simulate actual conditions, on representative samples of the actual substrate.

1. Provide stepped Samples, defining each separate coat, including block fillers and primers. Use representative colors when preparing Samples for review. Resubmit until required sheen, color, and texture are achieved.

2. Provide a list of materials and applications for each coat of each sample. Identify the manufacturer base paint information intended for each paint color. Label each sample with same identification number, manufacturer color name/number as listed in the finish schedule.

3. Submit Samples: 8-½" x 11" brush-outs for the Architect's review for each color and texture specified.

C. Qualification Data: For firms and persons specified in the "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

1.04 QUALITY ASSURANCE

A. Applicator Qualifications: Engage an experienced applicator who has completed painting system applications similar in material and extent to that indicated for this Project with a record of successful in-service performance.

B. Source Limitations: Obtain block fillers, primers, and undercoat materials for each coating system from the same manufacturer as the finish coats unless specified otherwise.

C. Benchmark Samples (Mockups): Provide a full-coat benchmark finish sample of each type of coating and substrate required on the Project. Duplicate finish of approved prepared samples.

1. The Architect will select one room or surface to represent surfaces and conditions for each type of coating and substrate to be painted.

a. Wall Surfaces: Provide samples on at least 100 sq. ft. of wall surface.

b. Small Areas and Items: The Architect will designate an item or area as required.

2. After permanent lighting and other environmental services have been activated, apply coatings in this room or to each surface according to the Schedule or as specified. Provide required sheen, color, and texture on each surface.

a. After finishes are accepted, the Architect will use the room or surface to evaluate coating systems of a similar nature.

3. Final approval of colors will be determined by University's Representative.

D. At Project Manager's discretion Contractor shall notify the University's Representative prior to the application of each coat of primer and paint to verify color and coating system.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project Site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label, and the following information:

1. Product name or title of material

2. Product description (generic classification or binder type)

3. Manufacturer's stock number and date of manufacture

4. Contents by volume, for pigment and vehicle constituents

5. Thinning instructions

6. Application instructions

7. Color name and number

8. VOC content

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45ºF. Maintain containers used in storage in a clean condition, free of foreign materials and residue.

1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily. Take necessary measures to ensure that workers and work areas are protected from fire and health hazards resulting from handling, mixing, and application.

1.06 PROJECT CONDITIONS

A. Apply water-based paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 50º and 90ºF.

B. Apply solvent-thinned paints only when the temperature of surfaces to be painted and surrounding air temperatures are between 45º and 95ºF.

C. Do not apply paint in snow, rain, fog, or mist; or when the relative humidity exceeds 85%; or at temperatures less than 5ºF above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART II - PRODUCTS

2.01 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in the paint schedules.

B. Products: Provide one of the products identified in the paint schedule for the base paint. Actual paint colors may be specified from other manufacturer. Add formulated colorants as required to base paint to achieve color specified.

C. Manufacturers Names: The following manufacturers are referred to in the paint schedules by use of shortened versions of their names, which are shown in parentheses:

1. Kelly Moore Paints (KM)

2. Sherwin-Williams Co. (S-W)

3. Or equal.

2.02 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, undercoats, and finish-coat materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

1. Proprietary Names: Use of manufacturer's proprietary product names is not intended to imply that products named are required to be used to the exclusion of equivalent products of other manufacturers. Furnish manufacturer's material data and certificates of performance for proposed substitutions under "Substitutions" in Section 01610 Product Requirements.

PART III - EXECUTION

3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with the Applicator present, under which painting will be performed for compliance with paint application requirements.

1. Do not begin to apply paint until unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.

2. Start of painting will be construed as the Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.

1. Notify the Architect about anticipated problems using the materials specified over substrates primed by others.

3.02 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of the size or weight of the item, provide surface-applied protection before surface preparation and painting. Art and signage will be removed by the University. Notify the University's representative well in advance of the intended removal date.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved. Notify University's representative to reinstall items the University removed.

B. Cleaning: Before applying paint or other surface treatments, clean the substrates of substances that could impair the bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

2. Cementitious Materials: Prepare concrete, concrete masonry block, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.

a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.

b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces where moisture content exceeds that permitted in manufacturer's written instructions.

3. Wood: Clean surfaces of dirt, oil, and other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sand surfaces exposed to view smooth and dust off.

a. Scrape and clean small, dry, seasoned knots, and apply a thin coat of white shellac or other recommended knot sealer before applying primer. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood filler. Sand smooth when dried.

b. Prime, stain, or seal wood to be painted immediately on delivery. Prime edges, ends, faces, undersides, and backsides of wood, including cabinets, counters, cases, and paneling.

c. When transparent finish is required, backprime with spar varnish.

d. Backprime paneling on interior partitions where masonry, plaster, or other wet wall construction occurs on backside.

e. Seal tops, bottoms, and cutouts of unprimed wood doors with a heavy coat of varnish or sealer immediately on delivery.

4. Ferrous Metals: Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with the Steel Structures Painting Council's (SSPC) recommendations.

a. Blast steel surfaces clean as recommended by paint system manufacturer and according to requirements of SSPC-SP 10.

b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.

c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with the same primer as the shop coat.

5. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Materials Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.

2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.

3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of the same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.03 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the schedules.

2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.

3. Provide finish coats that are compatible with primers used.

4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, convector covers, covers for finned-tube radiation, grilles, and similar components are in place. Extend coatings in these areas, as required, to maintain the system integrity and provide desired protection.

5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before the final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.

6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.

7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.

8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.

9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.

10. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and the film thickness required are the same regardless of application method. Do not apply succeeding coats until the previous coat has cured as recommended by the manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.

2. Omit primer on metal surfaces that have been shop primed and touchup painted.

3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and where application of another coat of paint does not cause the undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for the type of material applied. Use brush of appropriate size for the surface or item being painted.

2. Rollers: Use rollers of carpet, velvet back, or high-pile sheep's wool as recommended by the manufacturer for the material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by the manufacturer for the material and texture required.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate. Provide the total dry film thickness of the entire system as recommended by the manufacturer.

E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and in occupied spaces.

F. Mechanical items to be painted include, but are not limited to, the following:

1. Piping, pipe hangers, and supports.

2. Heat exchangers.

3. Tanks.

4. Ductwork.

5. Insulation.

6. Motors and mechanical equipment.

7. Accessory items.

G. Electrical items to be painted include, but are not limited to, the following:

1. Conduit and fittings.

2. Switchgear.

3. Panelboards.

H. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

I. Prime Coats: Before applying finish coats, apply a prime coat of material, as recommended by the manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn through or other defects due to insufficient sealing.

J. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

K. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.

1. Provide satin finish for final coats.

L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.04 FIELD QUALITY CONTROL

A. The University reserves the right engage the services of an independent testing agency to sample the paint material being used. Samples of material delivered to the Project will be taken, identified, sealed, and certified in the presence of the Contractor.

1. The University may direct the Contractor to stop painting if test results show material being used does not comply with specified requirements. The Contractor shall remove noncomplying paint from the site, pay for testing, and repaint surfaces previously coated with the rejected paint. If necessary, the Contractor may be required to remove rejected paint from previously painted surfaces if, on repainting with specified paint, the 2 coatings are incompatible.

3.05 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from the site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping. Be careful not to scratch or damage adjacent finished surfaces.

3.06 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage by painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

B. Provide "Wet Paint" signs to protect newly painted finishes. Remove temporary protective wrappings provided by others to protect their work after completing painting operations.

1. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

END OF SECTION 09900