

PROJECT MANUAL
July 24, 2025

Intermountain Health

HOLLADAY INSTACARE PROCEDURE ROOM UPDATES

**6272 S HIGHLAND DR.
MURRAY, UT 84121**

**Intermountain Healthcare Project No.: 10019936
Galloway Project No.: IHC000054**



GALLOWAY AND COMPANY

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Salt Lake City, Utah 84111
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END OF SECTION 00 0110

**SECTION 00 3100
AVAILABLE PROJECT INFORMATION**

PART 1 GENERAL

1.01 SUMMARY

- A. This Section references other information relevant to the construction of this Project that is available project information.
- B. At the request of the Owner the information identified below represents services that have been provided by others, not as an Architect's Consultant, regarding conditions that affect this Project that are beyond the responsibilities of the Architect and Architect's Consultants. Architect takes no representation, expressed or implied, as to the accuracy or validity of the information.

1.02 SITE EXAMINATION

- A. Bidders are expected to examine the site and the information available from the Owner to determine for themselves the conditions to be encountered.
- B. If conditions other than those indicated in the information available from the Owner are encountered before or during construction, notify the Owner before work continues.

1.03 INFORMATIONAL REPORTS

- A. Intermountain Healthcare Pre-Construction REsponsibility Matrix (Appendix A):
 - 1. Identifies items that are to be included in the capital project build-out.
- B. Infection Control Risk Assessment Report:
 - 1. The Owner's Risk Assessment Consultant has assessed the environmental impact of the work on the existing, adjacent healthcare functions, and has prepared an Infection Control Risk Assessment (ICRA) report (Appendix B) that includes specific requirements of the Contractor.
 - 2. Copies are available from the Owner upon request.
 - 3. The ICRA establishes strategic infection control provisions and requirements for the purpose of controlling the dissemination of airborne micro-organism contaminants encountered or generated during the construction process through the use of containment protocols and environmental monitoring.
- C. Division 27 - Communications" and Low Voltage + Network Structured Cable Specifications & Standards prepared by Intermountain Healthcare.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION 00 3100

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SECTION 00 4000

BID FORM

TO: **IHC Health Services, Inc.** (Intermountain Healthcare)
Facility Design and Construction (FD&C)
36 South State Street, 16th Floor
Salt Lake City, Utah 84111-1486

Attention: Alexis Cecena
Email: Alexis.Cecena@imail.org

PROJECT: **Holladay Instacare Procedure Room Updates #10019936**
6272 S Highland Dr., Murray, UT 84121

NAME OF BIDDER: _____

BIDDER ADDRESS: _____

DATE: _____

The undersigned, in compliance with your Invitation To Bid, having examined the Drawings and Specifications (Contract Documents) and related documents and the site of the proposed work and being familiar with all of the conditions surrounding the construction of the proposed project, including the availability of labor, hereby propose to furnish all labor, materials, services, equipment and appliances required in connection with or incidental to the construction of the above named project in strict conformance with the following specification and drawings:

Instructions to Bidders, General Conditions, Supplemental General Conditions, Specification Divisions as shown and all applicable addenda and Drawings as listed on the drawing cover sheets as prepared by Galloway.

I/We certify, by signing this BID FORM, that I/We have a working relationship with the proposed subcontractors and that Bids we're not solicited from; and/or the received Contract Documents were not listed in any Plan Rooms for distribution to subcontractors broadly.

BASE BID – for the Holladay Instacare Procedure Room Updates

For Work of the contract listed above and shown on the Drawings and described in the Project Manual, I/We agree to perform for the sum of:

_____ Dollars (\$_____)
(In the case of discrepancy, written amount shall govern)

CONTRACTOR'S PROPOSED CONSTRUCTION TIME PERIOD:

This Bid requires a construction time in **calendar days** from the date of authorization of _____ calendar days. The anticipated date of Substantial Completion is thus _____, 20____.

The above Bid includes _____ winter weather delay days.

ADDENDA:

I/We acknowledge receipt of the following addenda for the above noted project: ____/____/____/____/____

SCHEDULE OF VALUES:

I/We have attached with this Bid Form our Schedule of Values (Section 00 4373) which reflects the above Base Bid. We submit this for Owner review of subcontractors that are being proposed for this Project.

TYPE OF ORGANIZATION:

(Corporation, Partnership, Individual, etc.) _____

SEAL (If a Corporation)

Respectfully Submitted,

Name of Bidder

Authorized Signature

**SECTION 00 4373
SCHEDULE OF VALUES**

NAME OF BIDDER:

DATE:

DIV	TITLE	AMOUNT	\$/SQ. FT	COMMENTS
01	GENERAL CONDITIONS	\$ _____	\$ _____	
02	DEMOLITION	\$ _____	\$ _____	
02	SAW CUT SLAB	\$ _____	\$ _____	
03	CONCRETE	\$ _____	\$ _____	
04	MASONRY	\$ _____	\$ _____	
05	STEEL	\$ _____	\$ _____	
06	WOODS AND PLASTICS	\$ _____	\$ _____	
07	THERMAL AND MOISTURE PROTECTION	\$ _____	\$ _____	
08	OPENINGS	\$ _____	\$ _____	
09	FINISHES	\$ _____	\$ _____	
10	SPECIALTIES	\$ _____	\$ _____	
12	FURNISHINGS	\$ _____	\$ _____	
21	FIRE SUPPRESSION	\$ _____	\$ _____	
22	PLUMBING	\$ _____	\$ _____	
23	HVAC	\$ _____	\$ _____	
26	ELECTRICAL	\$ _____	\$ _____	
31	EARTHWORK	\$ _____	\$ _____	
32	LANDSCAPE	\$ _____	\$ _____	
33	UTILITIES	\$ _____	\$ _____	
	SUBTOTAL	\$ _____	\$ _____	
	OVERHEAD AND PROFIT	\$ _____	\$ _____	
	TOTAL COST	\$ _____	\$ _____	

END OF SECTION 00 4373

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**SECTION 00 5200
OWNER/CONTRACTOR AGREEMENT**

PART 1 - GENERAL

1.01 SUMMARY

- A. Intermountain Healthcare's 'CONTRACTOR AGREEMENT' (Stipulated Sum) for Construction between the Owner and General Contractor' where the basis of payment is a STIPULATED SUM, will presumably be used on this project. An electronic copy may be obtained from Intermountain Healthcare's Project Manager.

END OF SECTION 00 5200

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SECTION 00 6000
BONDS, CERTIFICATES AND OWNER DOCUMENTS

PART 1 GENERAL

1.01 SUMMARY

- A. The following documents are incorporated by reference; copies may be obtained from Intermountain Healthcare for the cost of reproduction, if necessary. Electronic copies of the Intermountain Healthcare Documents can be obtained by contacting the Intermountain Healthcare Project Manager.
1. Intermountain Healthcare Document - 'Application and Certificate for Payment'
 2. Intermountain Healthcare Document - 'Application and Certificate for Payment - Continuation Sheet'
 3. Intermountain Healthcare Document - 'Change Order' (CO)
 4. Intermountain Healthcare Document - 'Proposed Change Order' (PCO)
 5. Intermountain Healthcare Document - 'A/E Supplement Instructions' (ASI)
 6. Intermountain Healthcare Document - 'Proposal Request' (PR)
 7. Intermountain Healthcare Document - 'Construction Change Directive' (CCD)
 8. Intermountain Healthcare Document - 'Request For Information' (RFI)
 9. Intermountain Healthcare Document - 'Certificate of Substantial Completion'
 10. Intermountain Healthcare Document - 'Lien Waiver and Release Templates'
 11. Intermountain Healthcare Document - 'Consent of Surety to Final Payment' (if required)
 12. Intermountain Healthcare Document - 'Consent of Surety to Reduction in or Partial Release of Retainage' (if required)
 13. Intermountain Healthcare Document - 'Payment Bond' (if required)
 14. Intermountain Healthcare Document - 'Performance Bond' (if required)
 15. Intermountain Healthcare Document - 'Covid-19 Certification Form'

END OF SECTION 00 6000

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	Utah State Tax Commission • 210 N 1950 W • Salt Lake City, UT 84137 Exemption Certificate (Sales, Use, Tourism and Motor Vehicle Rental Tax)	TC-721 Rev. 5/17
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Name of business or institution claiming exemption (purchaser)		Telephone number	
Street address	City	State	ZIP Code
Authorized signature	Name (please print)	Title	
Name of Seller or Supplier:		Date	
Sales Tax License Number:		<i>Required for all exemptions marked with an asterisk (*)</i>	

The signer of this certificate **MUST** check the box showing the basis for which the exemption is being claimed.

DO NOT SEND THIS CERTIFICATE TO THE TAX COMMISSION
 Keep it with your records in case of an audit.

For purchases by government, Native American tribes and public schools, use form TC-721G.

☐ **Resale or Re-lease**

I certify I am a dealer in tangible personal property or services that are for resale or re-lease. If I use or consume any tangible personal property or services I purchase tax free for resale, or if my sales are of food, beverages, dairy products and similar confections dispensed from vending machines (see Rule R865-19S-74), I will report and pay sales tax directly to the Tax Commission on my next sales and use tax return.

☐ **Religious or Charitable Institution**

I certify the tangible personal property or services purchased will be used or consumed for essential religious or charitable purposes. **This exemption can only be used on purchases totaling \$1,000 or more, unless the sale is pursuant to a contract between the seller and purchaser.**

☐ **Construction Materials Purchased for Religious and Charitable Organizations**

I certify the construction materials are purchased on behalf of a religious or charitable organization and that they will be installed or converted into real property owned by the religious or charitable organization.

Name of religious or charitable organization: _____

Name of project: _____

☐ **Machinery and Equipment and Normal Operating Repair or Replacement Parts Used in a Manufacturing Facility, Mining Activity or Web Search Portal or Electronic Payment Service**

I certify the machinery and equipment and normal operating repair or replacement parts have an economic life of three years or more and are for use in a Utah manufacturing facility described in SIC Codes 2000-3999; in a qualifying scrap recycling operation; in a co-generation facility placed in service on or after May 1, 2006; in the operation of a Web search portal by a new or expanding business described in NAICS Code 518112 between July 1, 2010 and June 30, 2014; in the operation of an electronic financial payment service described in NAICS Code 522320; or in a business described in NAICS 212, Mining (except Oil and Gas), or NAICS 213113, Support Activities for Coal Mining, NAICS 213114, Support Activities for Metal Mining, or NAICS 213115, Support Activities for Nonmetallic Minerals (except Fuels) Mining. For a definition of exempt mining equipment, see Utah Code §59-12-104(14).

☐ **Fuels, Gas, Electricity**

I certify all natural gas, electricity, coal, coke, and other fuel purchased will be used for industrial use only and not for residential or commercial purposes.

☐ **Auto, Industrial Gas, or Drilling Equipment Manufacturer**

I certify the machinery, equipment, normal operating or replacement parts are used or consumed in a manufacturing process as described in NAICS 336111 (Automotive Manufacturing), or 325120 (Industrial Gas Manufacturing) to manufacture hydrogen of the 2002 North American Industry Classifications Systems, or by a drilling equipment manufacturer as defined in Utah Code §59-12-102.

☐ **Pollution Control Facility**

I certify our company has been granted a "Certification of Pollution Control Facilities" as provided for by Utah Code §§19-12-101 - 19-12-305 by either the Air Quality Board or the Water Quality Board. I further certify each item of tangible personal property purchased under this exemption is qualifying.

☐ **Steel Mill**

I certify the rolls, rollers, refractory brick, electric motors or other replacement parts will be used in the furnaces, mills or ovens of a steel mill as described in Standard Industrial Classification (SIC) 3312.

☐ **Municipal Energy**

I certify the natural gas or electricity purchased: is for resale; is prohibited from taxation by federal law, the U.S. Constitution, or the Utah Constitution; is for use in compounding or producing taxable energy; is subject to tax under the Motor and Special Fuel Tax Act; is used for a purpose other than as a fuel; is used by an entity exempted by municipal ordinance; or is for use outside a municipality imposing a municipal energy sales and use tax. The normal sales tax exemptions under Utah Code §59-12-104 do not apply to the Municipal Energy Sales and Use Tax.

☐ **Short-term Lodging Consumables**

I certify the tangible personal property is consumable items purchased by a lodging provider as described in Utah Code §59-12-103(1)(i).

☐ **Direct Mail**

I certify I will report and pay the sales tax for direct mail purchases on my next Utah *Sales and Use Tax Return*.

☐ **Commercial Airlines**

I certify the food and beverages purchased are by a commercial airline for in-flight consumption; or, any parts or equipment purchased are for use in aircraft operated by common carriers in interstate or foreign commerce.

☐ **Commercials, Films, Audio and Video Tapes**

I certify that purchases of commercials, films, prerecorded video tapes, prerecorded audio program tapes or records are for sale or distribution to motion picture exhibitors, or commercial television or radio broadcasters. If I subsequently resell items to any other customer, or use or consume any of these items, I will report any tax liability directly to the Tax Commission.

☐ **Alternative Energy**

I certify the tangible personal property meets the requirements of Utah Code §59-12-104 and is leased or purchased by or for an alternative energy electricity production facility, a waste energy production facility, or a facility that produces fuel from alternative energy.

☐ **Locomotive Fuel**

I certify this fuel will be used by a railroad in a locomotive engine.

☐ **Research and Development of Alternative Energy Technology**

I certify the tangible personal property purchased will be used in research and development of alternative energy technology.

☐ **Life Science Research and Development Facility**

I certify that: (1) the machinery, equipment and normal operating repair or replacement parts purchased have an economic life of three or more years for use in performing qualified research in Utah; or (2) construction materials purchased are for use in the construction of a new or expanding life science research and development facility in Utah.

☐ **Mailing Lists**

I certify the printed mailing lists or electronic databases are used to send printed material that is delivered by U.S. mail or other delivery service to a mass audience where the cost of the printed material is not billed directly to the recipients.

☐ **Semiconductor Fabricating, Processing or Research and Development Material**

I certify the fabricating, processing, or research and development materials purchased are for use in research or development, manufacturing, or fabricating of semiconductors.

☐ **Aircraft Maintenance, Repair and Overhaul Provider**

I certify these sales are to or by an aircraft maintenance, repair and overhaul provider for the use in the maintenance, repair, overhaul or refurbishment in Utah of a fixed-wing, turbine-powered aircraft that is registered or licensed in a state or country outside Utah.

☐ **Ski Resort**

I certify the snow-making equipment, ski slope grooming equipment or passenger rope-ways purchased are to be paid directly with funds from the ski resort noted on the front of this form.

☐ **Machinery or Equipment Used by Payers of Admissions or User Fees**

I certify that: (1) the machinery or equipment has an economic life of three or more years and will be used by payers of admissions or user fees (Utah Code §59-12-103(1)(f)); (2) the buyer is in the amusement, gambling or recreation industry (NAICS Subsector 713); and (3) at least 51 percent of the buyer's sales revenue for the previous calendar quarter came from admissions or user fees.

☐ **Film, Television, Radio**

I certify that purchases, leases or rentals of machinery or equipment will be used by a motion picture or video production company for the production of media for commercial distribution.

☐ **Telecommunications Equipment, Machinery or Software**

I certify these purchases or leases of equipment, machinery, or software, by or on behalf of a telephone service provider, have a useful economic life of one or more years and will be used to enable or facilitate telecommunications; to provide 911 service; to maintain or repair telecommunications equipment; to switch or route telecommunications service; or for sending, receiving, or transporting telecommunications service.

☐ **Leasebacks**

I certify the tangible personal property leased satisfies the following conditions: (1) the property is part of a sale-leaseback transaction; (2) sales or use tax was paid on the initial purchase of the property; and, (3) the leased property will be capitalized and the lease payments will be accounted for as payments made under a financing arrangement.

☐ **Prosthetic Devices**

I certify the prosthetic device(s) is prescribed by a licensed physician for human use to replace a missing body part, to prevent or correct a physical deformity, or support a weak body part. This is also exempt if purchased by a hospital or medical facility. (Sales of corrective eyeglasses and contact lenses are taxable.)

☐ **Out-of-State Construction Materials**

I certify this tangible personal property will be shipped out of state and will become part of real property located in a state that does not have a sales tax or allow credit for tax paid to Utah.

☐ **Construction Materials Purchased for Airports**

I certify the construction materials are purchased by, on behalf of, or for the benefit of Salt Lake International Airport, or a new airport owned or operated by a city in Davis, Utah, Washington or Weber County. I further certify the construction materials will be installed or converted into real property owned by and located at the airport.

☐ **Agricultural Producer**

I certify the items purchased will be used primarily and directly in a commercial farming operation and qualify for the Utah sales and use tax exemption. **This exemption does not apply to vehicles required to be registered.**

☐ **Tourism/Motor Vehicle Rental**

I certify the motor vehicle being leased or rented will be temporarily used to replace a motor vehicle that is being repaired pursuant to a repair or an insurance agreement; the lease will exceed 30 days; the motor vehicle being leased or rented is registered for a gross laden weight of 12,001 pounds or more; or, the motor vehicle is being rented or leased as a personal household goods moving van. This exemption applies only to the tourism tax (up to 7 percent) and the short-term motor vehicle rental tax (Transportation Corridor Funding – 2.5 percent) – not to the state, local, transit, zoo, hospital, highways, county option or resort sales tax.

☐ **Textbooks for Higher Education**

I certify that textbooks purchased are required for a higher education course, for which I am enrolled at an institution of higher education, and qualify for this exemption. An institution of higher education means: the University of Utah, Utah State University, Utah State University Eastern, Weber State University, Southern Utah University, Snow College, Dixie State University, Utah Valley University, Salt Lake Community College, or the Utah System of Technical Colleges.

* **Purchaser must provide sales tax license number in the header on page 1.**

NOTE TO PURCHASER: You must notify the seller of cancellation, modification, or limitation of the exemption you have claimed.

Questions? Email taxmaster@utah.gov, or call 801-297-2200 or 1-800-662-4335.

**SECTION 00 6276
EXEMPTION CERTIFICATE**

PART 1 - GENERAL

1.01 SUMMARY

- A. Construction materials purchased by or on behalf of Intermountain Healthcare may be exempt from Utah sales and use taxes. Tax Exempt Form TC-721 must be used by vendors when purchasing construction materials for Intermountain Healthcare projects. A copy of Form TC-721, with the Owner's pertinent tax information, follows this cover page.

END OF SECTION 00 6276

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**SECTION 00 7000
GENERAL CONDITIONS**

PART 1 - GENERAL

1.01 SUMMARY

- A. INTERMOUNTAIN HEALTHCARE GENERAL CONDITIONS of the Contract for Construction to be furnished, as requested. Where any part of the General Conditions is modified, the unaltered provisions shall remain in effect. An electronic copy may be obtained from Intermountain Healthcare's Project Manager.

END OF SECTION 00 7000

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**SECTION 00 7300
SUPPLEMENTARY GENERAL CONDITIONS**

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and other Division 1 Specification Sections, apply to this Section.

1.02 DEFINITIONS

- A. For purposes of this contract and these documents, the term Contractor and General Contractor shall be interchangeable with the term GC.

1.03 PERMITS AND FEES

- A. The following shall be the **Contractor's responsibilities** unless modified elsewhere in the contract documents:
 - 1. Temporary utility connection fees and deposits.
 - 2. Construction trade specific permit fees as required.
 - 3. Landfill Fees.
 - 4. Fees required for temporary controls and measures.
 - 5. Other Fees required not identified herein.
- B. The following shall be the **Owner's responsibilities** unless modified elsewhere in the contract documents:
 - 1. Plan check fees.
 - 2. Building Permit.
 - 3. General Impact Fees.
 - 4. Permanent Utility Connection and Impact Fees.

1.04 LAWS AND REGULATIONS

- A. The bidder's attention is directed to the fact that all applicable State Laws, Municipal ordinances and the rules and regulations of all authorities having jurisdiction over the construction of the project shall apply to the contract throughout and they will be deemed to be included in the contract the same as though written in full. It is understood and agreed that the contractor shall pay and discharge all license fees, assessments, sales, use, property and other tax or taxes.

1.05 SITE INVESTIGATIONS, REPRESENTATIONS, AND PHOTOGRAPHIC SURVEY

- A. The Contractor acknowledges that he has satisfied himself as to the nature and location of the work, the general and local conditions particularly those bearing upon transportation, disposal, handling and storage of materials, availability of labor, materials, water, electric power, road, uncertainties of weather, the conformation and condition of the ground, the character, quality and quantity of surfaces and subsurface materials to be encountered, the character of the equipment and facilities needed preliminary to and during the prosecution of the work and all other matters which can in any way affect the work or the cost thereof under this contract. Failure by the Contractor shall not relieve him from responsibility for performing the work.

1.06 INTERPRETATION OF SPECIFICATIONS AND DRAWINGS

- A. The Contract Documents are complementary and what is called for by anyone shall be as binding as if called for by all.
- B. The drawings shall not be scaled. Dimensional issues shall be clarified with the Architect.
- C. For convenience of reference the drawings and specifications are separated into respective divisions and sections. Elements of the project are defined throughout the documents irrespective of divisions or sections. The General Contractor shall be responsible for the entire scope of the project. The forming of these separations shall not operate to make the Owner, or any of its representatives, an arbiter to establish subcontract limits between Contractor and subcontractors or suppliers.

- D. Omissions from the drawings or specifications, or the misdescription of the details of work which are manifestly necessary to carry out the intent of the drawings or specifications, or which are customarily performed, shall not relieve the Contractor from performing such omitted or misdescribed details or work, but they shall be performed as if duly and clearly set forth and described in the drawings and specifications.
- E. In the event of a conflict between requirements or specifications, the requirement or specification resulting in the higher cost, as determined by the project's overall budget, shall prevail.
- F. All Sections included in the Project Manual are included as portions of the Contract Documents. All interpretations and conclusions drawn by the Contractor are his responsibility.

1.07 CONTRACT TIME

- A. Construction Duration: Complete project in conjunction with requirements as outlined in the ITB.

1.08 PERFORMANCE AND PAYMENT BONDS

- A. As defined in the Owner/Contractor Agreement.

1.09 PAYMENT RETENTION PROCEDURE

- A. As defined in the Owner/Contractor Agreement.

1.10 TAXES

- A. Tax Exempt Status: Yes

1.11 WEATHER DELAY DAYS AND WEATHER CONDITIONS

- A. As defined in the Owner/Contractor Agreement.

1.12 LIQUIDATED DAMAGES

- A. As defined in the Owner/Contractor Agreement.

1.13 GENERAL CONTRACTOR'S WARRANTY

- A. In addition to all other warranties identified in the Construction Documents, the General Contractor shall warrant all work for a period of no less than one year after date of substantial completion has been agreed to by all parties.

SECTION 01 1000 SUMMARY

PART 1 GENERAL

1.01 PROJECT

- A. Project Name: IHC Holladay InstaCare Procedure Rooms
- B. Owner's Name: Intermountain Health.
- C. Architect's Name: Galloway & Company, Inc..
- D. The Project consists of the _____ of Adding 2 Sliding Doors to 2 Procedure Rooms, requires adding walls, removing walls, reuse of wood door and addition of VAV box and mechanical ductwork. Patch and repair all damage to existing as a result of work to be completed..

1.02 CONTRACT DESCRIPTION

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 5200 Owner/Contractor Agreement.

1.03 WORK BY OWNER

1.04 OWNER OCCUPANCY

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.05 CONTRACTOR USE OF SITE

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Arrange use of site and premises to allow:
 - 1. Normal Operations by Owner.
- C. Provide access to and from site as required by law and by Owner:
 - 1. Emergency Building Exits During Construction: Keep all exits required by code open during construction period; provide temporary exit signs if exit routes are temporarily altered.
 - 2. Do not obstruct roadways, sidewalks, or other public ways without permit.
- D. Utility Outages and Shutdown:
 - 1. Do not disrupt or shut down life safety systems, including but not limited to fire sprinklers and fire alarm system, without 7 days notice to Owner and authorities having jurisdiction.
 - 2. Prevent accidental disruption of utility services to other facilities.

END OF SECTION 01 1000

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SECTION 01 2500 SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Procedural requirements for proposed substitutions.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures, coordination.
- B. Section 01 6000 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.
- C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Restrictions on emissions of indoor substitute products.

1.03 DEFINITIONS

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
 - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
 - a. Unavailability.
 - b. Regulatory changes.
 - c. Act of God.

1.04 REFERENCE STANDARDS

- A. CSI/CSC Form 1.5C - Substitution Request (During the Bidding/Negotiating Stage); Current Edition.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
 - 2. Agrees to provide the same warranty for the substitution as for the specified product.
 - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
 - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
 - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
 - 1. Forms indicated in the Project Manual are adequate for this purpose, and must be used.
- D. Limit each request to a single proposed substitution item.
 - 1. Submit an electronic document, combining the request form with supporting data into single document.

3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT

- A. Submittal Time Restrictions:

1. Owner will consider requests for substitutions only if submitted at least 7 days prior to the date for receipt of bids.
- B. Submittal Form (before award of contract):
 1. Submit substitution requests by completing CSI/CSC Form 1.5C - Substitution Request. See this form for additional information and instructions. Use only this form; other forms of submission are unacceptable.

3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION

- A. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- B. Substitutions will not be considered under one or more of the following circumstances:
 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
 2. Without a separate written request.
 3. When acceptance will require revisions to Contract Documents.

3.04 RESOLUTION

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

3.05 ACCEPTANCE

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

3.06 CLOSEOUT ACTIVITIES

- A. See Section 01 7800 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

END OF SECTION 01 2500

**SECTION 01 2600
CONTRACT MODIFICATION PROCEDURES**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract

1.02 MODIFICATIONS.

1.03 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's Form "Architect's Supplemental Instructions".

1.04 PROPOSAL REQUESTS

- A. Owner-Initiated Proposed Change: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time using Architect's Form "Proposed Change". If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Proposed Changes issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposed Change or with reasonable promptness, when not otherwise specified, after receipt of Proposed Change, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Include updated Submittal Schedule showing effect of the change.
- B. Contractor-Initiated Proposed Change: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect using Contractor's Standard Form.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Include updated Submittal Schedule showing effect of the change.
 - 7. Comply with requirements in Division 01 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.05 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: If applicable, see Division 01 Section "Allowances" for administrative procedures for preparation of Proposed Change for adjusting the Contract Sum to reflect actual costs of allowances.
- B. Unit-Price Adjustment: If applicable, see Division 01 Section "Unit Prices" for administrative procedures for preparation of Proposed Change for adjusting the Contract Sum to reflect measured scope of unit price work.
- C. Alternates: If applicable, see Division 01 Section "Alternates" for administrative procedures for preparation of Proposed Change for adjusting the Contract Sum to reflect measured scope of alternate work.

1.06 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Proposed Change, Architect will issue a Change Order for signatures of Owner and Contractor on Architects Form "Change Order".

1.07 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on Architects Form "Construction Change Directive". Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 2600



CONDITIONAL WAIVER AND RELEASE UPON PROGRESS PAYMENT

TO:	IHC HEALTH SERVICES, INC.	("Owner")
FROM:		("Contractor")
PROPERTY NAME:		("Property")
PROPERTY LOCATION:		
CONTRACT DATE:		
INVOICE DATE/NUMBER:		("Invoice")
INVOICE PERIOD:		
PAYMENT AMOUNT:	\$	("Payment Amount")
CONTRACT AMOUNTS:	Original Contract Sum: \$	
	Plus (Less) Approved Change Orders: \$	
	Adjusted Contract Sum: \$	
	Less Total Payments Received to Date (including this invoice): \$	
	Outstanding Adjusted Contract Sum: \$	

Under this Conditional Waiver and Release, Contractor releases Owner and the Property from, and waives, any notice of lien or right under Utah law (see Utah Code Ann., Title 38, Chapter 1a, Preconstruction and Construction Liens, and Utah Code Ann., Title 14, Contractors' Bonds, or Section 63G-6a-1103) related to payment rights the Contractor has on the Property once:

1. Contractor endorses a check in the Payment Amount payable to Contractor or provides valid wire transfer or direct deposit instructions; and
2. The check is paid by the depository institution on which it is drawn or the wired or direct-deposited funds in the Payment Amount are deposited into Contractor's designated account.

This Conditional Waiver and Release applies to the progress payment for the work, materials, equipment, or combination of work, materials, and equipment furnished by Contractor to the Property or to Owner covered by the Invoice. This Conditional Waiver and Release does not apply to any retention withheld; any items, modifications, or changes pending approval; disputed items and claims; or items furnished or invoiced after the Invoice Period.

Contractor warrants that it either has already paid, or will promptly use the Payment Amount received to pay in full all of Contractor's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment under the Invoice. Contractor has not assigned any lien or right to perfect a lien against the Property and has the right, power, and authority to execute this Conditional Waiver and Release.

_____, a _____

By: _____
Print Name: _____
Title: _____

STATE OF UTAH)
)
COUNTY OF _____)

On the _____ day of _____, 20____, this instrument was acknowledged before me by _____, the _____
(title) of _____, a _____.

Public Notary



WAIVER AND RELEASE UPON FINAL PAYMENT

TO:	IHC HEALTH SERVICES, INC.	("Owner")
FROM:		("Contractor")
PROPERTY NAME:		("Property")
PROPERTY LOCATION:		
CONTRACT DATE:		
INVOICE DATE/NUMBER:		("Invoice")
INVOICE PERIOD:		
TOTAL PAYMENT AMOUNT:	\$	("Payment Amount")
CONTRACT AMOUNTS:	Original Contract Sum:	\$
	Plus (Less) Approved Change Orders:	\$
	Adjusted Contract Sum:	\$

Under this Waiver and Release, Contractor releases Owner and the Property from, and waives, any notice of lien or right under Utah law (see Utah Code Ann., Title 38, Chapter 1a, Preconstruction and Construction Liens, and Utah Code Ann., Title 14, Contractors' Bonds, or Section 63G-6a-1103) related to payment rights the Contractor has on the Property once:

1. Contractor endorses a check in the Payment Amount payable to Contractor or provides valid wire transfer or direct deposit instructions; and
2. The check is paid by the depository institution on which it is drawn or the wired or direct-deposited funds in the Payment Amount are deposited into Contractor's designated account.

This Waiver and Release applies to the final payment for the work, materials, equipment, or combination of work, materials, and equipment furnished by Contractor to the Property or to Owner.

Contractor warrants that it either has already paid, or will promptly use the Payment Amount received to pay in full all of Contractor's laborers, subcontractors, materialmen, and suppliers for all work, materials, equipment, or combination of work, materials, and equipment under the Invoice. Contractor has not assigned any lien or right to perfect a lien against the Property and has the right, power, and authority to execute this Waiver and Release.

_____, a _____

By: _____

Print Name: _____

Title: _____

STATE OF UTAH)

_____)

COUNTY OF _____)

On the _____ day of _____, 20____, this instrument was acknowledged before me by _____, the _____
(title) of _____, a _____.

Public Notary

**SECTION 01 2900
IHC PAYMENT PROCEDURES**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.02 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Submittal schedule.
 - c. Accepted Alternates.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
 - 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments; provide subschedules showing values coordinated with each phase of payment.
 - 4. Subschedules for Separate Elements of Work: Where the Contractor's construction schedule defines separate elements of the Work; provide subschedules showing values coordinated with each element.
 - 5. Subschedules for Separate Design Contracts: Where the Owner has retained design professionals under separate contracts who will each provide certification of payment requests, provide subschedules showing values coordinated with the scope of each design services contract as described in Division 01 Section "Summary."
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange the schedule of values in tabular form, in format accepted by Architect, with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders.
 - g. Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 1) Labor.
 - 2) Materials.
 - 3) Equipment.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with Project Manual table of contents. Provide multiple line items for principal subcontract amounts, where appropriate.
 - 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If required, include evidence of insurance or bonded warehousing.
6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
7. Allowances (If Applicable): Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances (if applicable), as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
8. Alternates (If Applicable): Provide a separate line item in the schedule of values for each accepted Alternate
9. Change Orders: Provide a separate line item in the schedule of values for each change order.
10. Separate Owner-Consultant Contracts: Provide a separate line item in the schedule of values for each separate Owner-Consultant related Work item.
11. Purchase Contracts: When applicable, provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
12. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
 - b. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.03 ARCHITECTS COST DATA

- A. In addition to the Schedule of Values, submit itemized cost data reporting on Architect's Form. Initial submission shall be included with contractors first Application for Payment. Final updated submission shall be included with contractors final Application for Payment.

1.04 APPLICATIONS FOR PAYMENT

1.05 EACH APPLICATION FOR PAYMENT FOLLOWING THE INITIAL APPLICATION FOR PAYMENT SHALL BE CONSISTENT WITH PREVIOUS APPLICATIONS AND PAYMENTS AS CERTIFIED BY ARCHITECT AND PAID FOR BY OWNER.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
 1. If the Agreement does not state payment dates, establish dates at preconstruction conference.
 2. Submit draft, or pencil, copy of Application for Payment seven days prior to due date for review by Architect.
- C. Application for Payment Forms: Unless directed otherwise by Owner, use Intermountain standard form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Stored Materials: If accepted by Owner, include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored onsite and items stored off-site.
1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment, for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit 3 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's liens from General Contractor, subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 2. When an application shows completion of an item, submit conditional final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 4. Waiver Delays: Submit each Application for Payment with Contractor's waiver of mechanic's lien for construction period covered by the application.
 - a. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - b. Waiver Forms: Submit executed waivers of lien on forms, acceptable to Owner.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Schedule of unit prices.
 6. Submittal schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
 13. Certificates of insurance and insurance policies.
 14. Performance and payment bonds.

- I. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. When applicable, this application shall reflect Certificate(s) of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. Waiver and Release form.
 - 5. Evidence that claims have been settled.
 - 6. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work
 - 7. If applicable, final liquidated damages settlement statement.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 2900

**SECTION 01 3000
ADMINISTRATIVE REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. General administrative requirements.
- B. Electronic document submittal service.
- C. Progress photographs.
- D. Coordination drawings.
- E. Submittals for review, information, and project closeout.
- F. Number of copies of submittals.
- G. Requests for Interpretation (RFI) procedures.
- H. Submittal procedures.

1.02 RELATED REQUIREMENTS

- A. Section 01 3216 - Construction Progress Schedule: Form, content, and administration of schedules.
- B. Section 01 6000 - Product Requirements: General product requirements.
- C. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.
- D. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

1.03 GENERAL ADMINISTRATIVE REQUIREMENTS

- A. Comply with requirements of Section 01 7000 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
 - 1. Requests for Interpretation (RFI).
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Progress schedules.
 - 9. Coordination drawings.
 - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 11. Closeout submittals.

1.04 PROJECT COORDINATOR

- A. Project Coordinator: Construction Manager.
- B. Cooperate with the Project Coordinator in allocation of mobilization areas of site; for field offices and sheds, for sub-contractor access, traffic, and parking facilities.
- C. During construction, coordinate use of site and facilities through the Project Coordinator.
- D. Comply with Project Coordinator's procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
- E. Comply with instructions of the Project Coordinator for use of temporary utilities and construction facilities. Responsibility for providing temporary utilities and construction facilities is identified in Section 01 1000 - Summary.

- F. Coordinate field engineering and layout work under instructions of the Project Coordinator.
- G. Make the following types of submittals to Architect through the Project Coordinator:
 - 1. Requests for Interpretation.
 - 2. Requests for substitution.
 - 3. Shop drawings, product data, and samples.
 - 4. Test and inspection reports.
 - 5. Design data.
 - 6. Manufacturer's instructions and field reports.
 - 7. Applications for payment and change order requests.
 - 8. Correction Punch List and Final Correction Punch List for Substantial Completion.
 - 9. Closeout submittals.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION

3.01 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

- A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
 - 1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
 - 2. Contractor and Architect are required to use this service.
 - 3. It is Contractor's responsibility to submit documents in allowable format.
 - 4. Subcontractors, suppliers, and Architect's consultants are to be permitted to use the service at no extra charge.
 - 5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
 - 6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
 - 7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.
- B. Cost: The cost of the service is to be paid by Contractor; include the cost of the service in the Contract Sum.
- C. Submittal Service: The selected service is:
 - 1. ProCore.
- D. Training: One, one-hour, web-based training session will be arranged for all participants, with representatives of Architect and Contractor participating; further training is the responsibility of the user of the service.
- E. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

3.02 PRECONSTRUCTION MEETING

- A. Project Coordinator will schedule a meeting after Notice to Proceed.
- B. Attendance Required:
 - 1. Owner.
 - 2. Architect.

3. Contractor.
- C. Agenda:
 1. Execution of Owner-Contractor Agreement.
 2. Submission of executed bonds and insurance certificates.
 3. Distribution of Contract Documents.
 4. Submission of list of Subcontractors, schedule of values, and progress schedule.
 5. Designation of personnel representing the parties to Contract, _____ and Architect.
 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
 7. Scheduling activities.
- D. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.

3.03 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the work at minimum bi-weekly intervals.
- B. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.
- C. Attendance Required:
 1. Contractor.
 2. Owner.
 3. Architect.
 4. Project Engineering Consultants when required.
 5. Contractor's superintendent.
 6. Major subcontractors.
- D. Agenda:
 1. Review minutes of previous meetings.
 2. Review of work progress utilizing a three week look-ahead schedule.
 3. Field observations, problems, and decisions.
 4. Identification of problems that impede, or will impede, planned progress.
 5. Review of submittals schedule and status of submittals.
 6. Review of RFIs log and status of responses.
 7. Corrective measures to regain projected schedules.
 8. Planned progress during succeeding work period.
 9. Coordination of projected progress.
 10. Maintenance of quality and work standards.
 11. Effect of proposed changes on progress schedule and coordination.
 12. Other business relating to work.
- E. Record minutes and distribute copies within Three days after meeting to participants, with electronic copies to Architect, Owner, participants, and those affected by decisions made via electronic mail.

3.04 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at Project site and project progress:
 1. Date.
 2. High and low temperatures, and general weather conditions.
 3. List of subcontractors at Project site.
 4. List of separate contractors at Project site.
 5. Approximate count of personnel at Project site.
 6. Safety, environmental, or industrial relations incidents.
 7. Meetings and significant decisions.

8. Unusual events (submit a separate special report).
9. Stoppages, delays, shortages, and losses. Include comparison between scheduled work activities (in Contractor's most recently updated and published schedule) and actual activities. Explain differences, if any. Note days or periods when no work was in progress and explain the reasons why.
10. Meter readings and similar recordings.
11. Emergency procedures.
12. Directives and requests of Authority(s) Having Jurisdiction (AHJ).
13. Change Orders received and implemented.
14. Testing and/or inspections performed.
15. List of verbal instruction given by Owner and/or Architect.
16. Signature of Contractor's authorized representative.

3.05 PROGRESS PHOTOGRAPHS

- A. Submit new photographs bi-weekly, within 3 days after exposure.
- B. Photography Type: Digital; electronic files.
- C. Provide photographs of site and construction throughout progress of work produced by an experienced photographer, acceptable to Architect.
- D. In addition to periodic, recurring views, take photographs of each of the following events:
- E. Views:
 1. Provide non-aerial photographs from four cardinal views at each specified time, until date of Substantial Completion.
 2. Consult with Architect for instructions on views required.
 3. Provide factual presentation.
 4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.
- F. Digital Photographs: 24 bit color, minimum resolution of 1600 by 1200 ("2 megapixel"), in JPG format; provide files unaltered by photo editing software.
 1. Delivery Medium: Project Management On-line Platform.
 2. File Naming: Include project identification, date and time of view, and view identification.

3.06 COORDINATION DRAWINGS

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

3.07 REQUESTS FOR INTERPRETATION (RFI)

- A. Definition: A request seeking one of the following:
 1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
 2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
 1. Prepare a separate RFI for each specific item.
 - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
 - b. Do not forward requests which solely require internal coordination between subcontractors.
 2. Prepare using software provided by the Electronic Document Submittal Service and Owner.

3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
 1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
 2. Unacceptable Uses for RFIs: Do not use RFIs to request the following::
 - a. Approval of submittals (use procedures specified elsewhere in this section).
 - b. Approval of substitutions (see Section - 01 6000 - Product Requirements)
 - c. Changes that entail change in Contract Time and Contract Sum (comply with provisions of the Conditions of the Contract).
 - d. Different methods of performing work than those indicated in the Contract Drawings and Specifications (comply with provisions of the Conditions of the Contract).
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
 1. Official Project name and number, and any additional required identifiers established in Contract Documents.
 2. Owner's, Architect's, and Contractor's names.
 3. Discrete and consecutive RFI number, and descriptive subject/title.
 4. Issue date, and requested reply date.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
 1. Indicate current status of every RFI. Update log promptly and on a regular basis.
 2. Note dates of when each request is made, and when a response is received.
 3. Highlight items requiring priority or expedited response.
 4. Highlight items for which a timely response has not been received to date.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
 1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
 1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
 2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
 3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
 4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

3.08 SUBMITTAL SCHEDULE

- A. Submit to Architect for review a schedule for submittals in tabular format.
 1. Coordinate with Contractor's construction schedule and schedule of values.
 2. Format schedule to allow tracking of status of submittals throughout duration of construction.

3. Arrange information to include scheduled date for initial submittal, specification number and title, submittal category (for review or for information), description of item of work covered, and role and name of subcontractor.
4. Account for time required for preparation, review, manufacturing, fabrication and delivery when establishing submittal delivery and review deadline dates.

3.09 SUBMITTALS FOR REVIEW

- A. When the following are specified in individual sections, submit them for review:
 1. Product data.
 2. Design data.
 3. Shop drawings.
 4. Samples for selection.
 5. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7800 - Closeout Submittals.

3.10 SUBMITTALS FOR INFORMATION

- A. When the following are specified in individual sections, submit them for information:
 1. Certificates.
 2. Test reports.
 3. Inspection reports.
 4. Manufacturer's instructions.
 5. Manufacturer's field reports.
 6. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

3.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 7800 - Closeout Submittals:
 1. Project record documents.
 2. Operation and maintenance data.
 3. Warranties.
 4. Bonds.
 5. Manufactures field reports.
 6. Building and Systems Commissioning documents as outlined in other sections.
 7. Other types as indicated.
- D. Final Property Survey.
- E. Submit for Owner's benefit during and after project completion.

3.12 NUMBER OF COPIES OF SUBMITTALS

- A. Electronic Documents: Submit one electronic copy in PDF format via email; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
 1. After review, produce duplicates.

2. Retained samples will not be returned to Contractor unless specifically so stated.

3.13 SUBMITTAL PROCEDURES

A. General Requirements:

1. Use a separate transmittal for each item.
2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
3. Transmit using approved form.
 - a. Use form generated by Electronic Document Submittal Service software.
4. Sequentially identify each item. For revised submittals use original number and a sequential numerical suffix.
5. Identify: Project; Contractor; subcontractor or supplier; pertinent drawing and detail number; and specification section number and article/paragraph, as appropriate on each copy.
6. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
 - a. Submittals from sources other than the Contractor, or without Contractor's stamp will not be acknowledged, reviewed, or returned.
7. Deliver each submittal on date noted in submittal schedule, unless an earlier date has been agreed to by all affected parties, and is of the benefit to the project.
 - a. Upload submittals in electronic form to Electronic Document Submittal Service website.
8. Schedule submittals to expedite the Project, and coordinate submission of related items.
 - a. For each submittal for review, allow 14 days excluding delivery time to and from the Contractor.
 - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
 - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
9. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
10. Provide space for Contractor and Architect review stamps.
11. When revised for resubmission, identify all changes made since previous submission.
12. Incomplete submittals will not be reviewed, unless they are partial submittals for distinct portion(s) of the work, and have received prior approval for their use.

B. Product Data Procedures:

1. Submit only information required by individual specification sections.
2. Collect required information into a single submittal.
3. Submit concurrently with related shop drawing submittal.
4. Do not submit (Material) Safety Data Sheets for materials or products.

C. Shop Drawing Procedures:

1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
2. Do not reproduce Contract Documents to create shop drawings.
3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.

D. Samples Procedures:

1. Transmit related items together as single package.
2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

- E. Shop Drawing Procedures:
 - 1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
 - 2. Do not reproduce the Contract Documents to create shop drawings.
 - 3. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.
- F. Transmit each submittal with a copy of approved submittal form.
- G. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.
- H. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.
- I. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.
- J. Schedule submittals to expedite the Project, and coordinate submission of related items.
- K. For each submittal for review, allow 14 days excluding delivery time to and from the Contractor.
- L. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.
- M. Provide space for Contractor and Architect review stamps.
- N. When revised for resubmission, identify all changes made since previous submission.
- O. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.
- P. Submittals not requested will not be recognized or processed.

3.14 SUBMITTAL REVIEW

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
 - 1. Authorizing purchasing, fabrication, delivery, and installation:
 - a. "No Exception Taken", or language with same legal meaning.
 - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
 - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
 - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
 - 1) Resubmit corrected item, with review notations acknowledged and incorporated. Resubmit separately, or as part of project record documents.
 - 2. Not Authorizing fabrication, delivery, and installation:
 - a. "Revise and Resubmit".
 - 1) Resubmit revised item, with review notations acknowledged and incorporated.
 - 2) Non-responsive resubmittals may be rejected.
 - b. "Rejected".
 - 1) Submit item complying with requirements of Contract Documents.
- E. Architect's and consultants' actions on items submitted for information:
 - 1. Items for which no action was taken:

- a. "Received" - to notify the Contractor that the submittal has been received for record only.
- 2. Items for which action was taken:
 - a. "Reviewed" - no further action is required from Contractor.

END OF SECTION 01 3000

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SECTION 01 3100
PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. Requests for Information (RFIs).
 - 4. Project Web site.
 - 5. Project meetings.

1.02 DEFINITIONS

- A. Project communications documents shall be defined as the following:
 - 1. Letters.
 - 2. Memoranda.
 - 3. E-Mail Communications/Internet Communications/Project Management Software Communications.
 - 4. RFI (Request for Information - Contractor).
 - 5. RFI-A (Request for Information - Architect).

1.03 FORMAT

- A. Letters and Memoranda: Submit in formats acceptable to the Architect.
- B. E-Mail Communications/Internet Communications/Project Management Software Communications: Submit in forms and formats acceptable to and as approved by the Architect.
- C. RFI (Request for Information - Contractor): Submit on forms furnished by the Architect, or on other forms as approved by the Architect.
- D. RFI-A (Request for Information - Architect), will be submitted by Architect to Contractor on Architects standard form.

1.04 PROJECT COMMUNICATIONS DOCUMENTS

- A. Letters and Memoranda documents shall be submitted in a timely manner so as to facilitate project delivery and coordination. Routing of communications shall be as established in the Contract, the Contract Documents and the Pre-Construction Conference. Communications documents shall be transmitted or forwarded in a manner consistent with the schedule and progress of the work.
- B. E-Mail Communications, Internet Communications, and Project Management Software programs must be compatible with the Architect's and Owner's computer systems and equipment. The responsibility for all costs for management of these systems, including, but not limited to, licensing, onsite training or other training necessary for the proper operation of such systems, shall be by the Contractor. The Contractor shall keep written records and hard file copies of all electronic communications. Failure of the Contractor to keep such records shall waive the Contractor's right to rely on such communications and such communications shall be deemed to have not taken place.
- C. RFI (Request for Information - Contractor) shall be defined and limited to a request from the Contractor seeking interpretation or clarification of the requirements of the Contract Documents. Such requests shall comply with the following requirements:
- D. RFI requests shall be submitted in a timely manner, well in advance of related work, and allow sufficient time for the resolution of issues relating to the request for interpretation or clarification. Contractor shall schedule the submission of RFI's so as to moderate and manage the flow of RFI requests. RFI's shall be submitted in a manner consistent with the schedule and progress of the work, and shall not be submitted in a sporadic and/or excessive manner.

1. RFI requests shall be numbered in a sequential manner and contain a detailed description of the areas of work requiring interpretation or clarification. Include drawing and specification references, sketches, technical data, brochures, or other supporting data as deemed necessary by the Architect, for the Architect to provide the interpretations and clarifications requested.
 - a. The Contractor shall include a "Proposed Solution" to the issue requiring interpretation or clarification.
 2. RFI's submitted to the Contractor by Sub-Contractors, vendors, suppliers, or other parties to the work shall be reviewed by the Contractor prior to submission to the Architect. If the Architect deems that such RFI requests have not been adequately reviewed by the Contractor, such requests will be returned to the Contractor for further action. Sub-Contractor's RFI shall contain a "Proposed Solution".
 3. RFI requests shall not contain submittals, substitutions requests, routine communications, correspondence, memos, claims, or any information required by other areas of the Contract Documents. RFI requests containing such information will be returned to the Contractor without action by the Architect.
 4. RFI requests are limited to a request for interpretation or clarification of the requirements of the Contract Documents. Interpretations provided by the Architect shall not change the requirements of the Contract or the Contract Documents. If the Contractor determines that the Architect's response to an RFI gives cause for a change in the Contract or the Contract Documents, the Contractor shall promptly, within 5 working days, give written notice to the Architect of request for adjustments. Requests for adjustments to the Contract shall be submitted in a manner consistent with the terms and conditions of the Contract Documents.
 5. If the Architect, after review, determines that any RFI has been submitted in an incomplete manner, is unnecessary, or does not otherwise comply with the requirements of this Section, the RFI will be returned without action to the Contractor. The Contractor shall delete the original submittal date from the RFI log and enter a new submittal date at the time of re-submittal.
 6. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use software log that is part of Project Web site. Software log with not less than the following:
 - a. Project name.
 - b. Name and address of Contractor.
 - c. Name and address of Architect.
 - d. RFI number including RFIs that were returned without action or withdrawn.
 - e. RFI description.
 - f. Date the RFI was submitted.
 - g. Date Architect's response was received.
 - h. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.
 - i. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- E. RFI-A (Request for Information - Architect) shall be defined as a request by the Architect for information relating to the obligations of the Contractor under the Contract.
1. After receipt of an RFI-A the Contractor shall provide a written response to the Architect within 5 working days. Responses shall be thorough, complete and shall contain all information requested by the Architect.
 2. An RFI-A shall be limited to a request by the Architect for information related to the project. The RFI-A shall not be construed as authorizing or directing a change in the Contract or the Contract Documents.
- F. Revisions to Construction Documents: Responses to requests for information (RFI) shall not serve as construction documents; and the Contractor shall not incorporate RFI responses into

construction of the Project, unless such answers bear the seal and signature of a licensed design professional.

1.05 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and Project Web site. Keep list current at all times.

1.06 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1.07 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

required to facilitate integration of products and materials fabricated or installed by more than one entity.

- B. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - 1. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - 2. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - 3. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - 4. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - 5. Indicate required installation sequences.
 - 6. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 - 1. File Preparation Format: Same digital data software program, version, and operating system as original Drawings.
 - 2. File Submittal Format: Submit or post coordination drawing files using Portable Data File (PDF) format.
 - 3. BIM File Incorporation: When applicable, develop coordination drawing files from Building Information Model (BIM) established for Project.
 - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Architect.
 - 4. Architect will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 - a. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 - b. Digital Data Software Program: Drawings are available in Autodesk Revit and/or Autocad; and compatible with Microsoft Windows operating system.
 - c. Contractor shall execute a data licensing agreement per IHC requirements.

1.08 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within 3 days of the meeting.
 - 4. Attendance: Document attendance of all participants.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction.
 - 1. Conduct the conference to review responsibilities and personnel assignments.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, and coordination with adjacent activities. Prepare agenda appropriate to Work.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, at a time to be decided prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. If applicable, requirements for completing sustainable design documentation.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - j. Submittal procedures.
 - k. If applicable, coordination of separate contracts.
 - l. If applicable, Owner's partial occupancy requirements.
 - m. Installation of Owner's furniture, fixtures, and equipment.
 - n. Responsibility for removing temporary facilities and controls.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Conduct progress meetings at regular intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these

- meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review schedule for next period.
 - 1) Review present and future needs of each entity present, including the following or as needed:
 - (a) Interface requirements.
 - (b) Sequence of operations.
 - (c) If applicable, resolution of BIM component conflicts.
 - (d) Status of submittals.
 - (e) If applicable, status of sustainable design documentation.
 - (f) Deliveries.
 - (g) Off-site fabrication.
 - (h) Access.
 - (i) Site utilization.
 - (j) Temporary facilities and controls.
 - (k) Work hours.
 - (l) Hazards and risks.
 - (m) Progress cleaning.
 - (n) Quality and work standards.
 - (o) Status of correction of deficient items.
 - (p) Field observations.
 - (q) Status of RFIs.
 - (r) Status of proposal requests.
 - (s) Pending changes.
 - (t) Status of Change Orders.
 - (u) Documentation of information for payment requests.
 - 2) Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
 - (a) Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- F. Coordination Meetings: Conduct Project coordination meetings on an as-needed basis. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: Each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Review present and future needs of each contractor present, including the following:
 - 1) 1) Interface requirements.
 - 2) 2) Sequence of operations.

- 3) 3) If applicable, resolution of BIM component conflicts.
- 4) 4) Status of submittals.
- 5) 5) Deliveries.
- 6) 6) Off-site fabrication.
- 7) 7) Access.
- 8) 8) Site utilization.
- 9) 9) Temporary facilities and controls.
- 10) 10) Work hours.
- 11) 11) Hazards and risks.
- 12) 12) Progress cleaning.
- 13) 13) Quality and work standards.
- 14) 14) Change Orders.

PART 2 - PRODUCTS

PART 3 - EXECUTION (NOT USED)

END OF SECTION 01 3100

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**SECTION 01 3200
CONSTRUCTION PROGRESS DOCUMENTATION**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work.
- B. Related Section:
 - 1. Provide Construction Photographs in accordance with Division 01 Section "Photographic Documentation".

1.02 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Major Area: A story of construction, a separate building, or a similar significant construction element.
- C. Milestone: A key or critical point in time for reference or measurement.
- D. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- E. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- F. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- G. Event: The starting or ending point of an activity.
- H. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- I. Fragnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.

1.03 SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF electronic file.
- B. Startup construction schedule.
- C. Startup Network Diagram: Of size required to display entire network for entire construction period. Show logic ties for activities.
- D. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

- E. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.
 - 1. Activity Report: List of all activities sorted by activity number and then early start date, or actual start date if known.
 - 2. Logic Report: List of preceding and succeeding activities for all activities, sorted in ascending order by

1.04 ACTIVITY NUMBER AND THEN EARLY START DATE, OR ACTUAL START DATE IF KNOWN.

- A. Total Float Report: List of all activities sorted in ascending order of total float.
- B. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Material Location Reports: Submit at monthly intervals.
- F. Site Condition Reports: Submit at time of discovery of differing conditions.
- G. Special Reports: Submit at time of unusual event.

1.05 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
- C. Secure time commitments for performing critical elements of the Work from entities involved.
- D. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.01 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each story or separate area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 2. Submittal Review Time: Include review and resubmittal times indicated in Division 01 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
 - 3. Startup and Testing Time: Include no fewer than 7 days for startup and testing.
 - 4. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 5. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule (where applicable), and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
 2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 3. Products Ordered in Advance: Include a separate activity for each product.
 4. Owner-Furnished Products: Include a separate activity for each product.
 5. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use of premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Building flush-out.
 - m. Startup and placement into final use and operation.
 7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Temporary enclosure and space conditioning.
 - c. Permanent space enclosure.
 - d. Completion of mechanical installation.
 - e. Completion of electrical installation.
 - f. Substantial Completion.
 8. Other Constraints include but are not limited to the following:
 - a. Roads.
 - b. Parking.
 - c. Landscape.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, punch list activities, Substantial Completion, and final completion.
- E. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, and equipment required to achieve compliance, and date by which recovery will be accomplished.
- F. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

2.02 STARTUP CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit startup, horizontal, bar-chart-type construction schedule within 14 days of date established for the Notice of Award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. Startup Network Diagram may be submitted in lieu of Bar-Chart Schedule.

2.03 CONTRACTOR'S CONSTRUCTION SCHEDULE (BAR CHART/GANTT CHART)

- A. Bar Chart/Gantt Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart type, Contractor's construction schedule within 30 days of date established for the Notice to Proceed. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

2.04 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's construction schedule using a time-scaled CPM network analysis diagram for the Work.
 - 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 - 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 - 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 - 4. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule in order to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the startup network diagram, prepare a skeleton network to identify probable critical paths.
 - 1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Purchase of materials.
 - c. Delivery.
 - d. Fabrication.
 - e. Installation.
 - f. Punch list and final completion.
 - 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract

- milestone dates. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
3. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
 - E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment, fragnet, to demonstrate the effect of the proposed change on the overall project schedule.
 - F. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Main events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the schedule of values).
 - G. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
 - H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
 1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.05 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 1. List of subcontractors at Project site.
 2. List of separate contractors at Project site.
 3. Approximate count of personnel at Project site.

4. High and low temperatures and general weather conditions, including presence of rain or snow.
 5. Accidents.
 6. Meetings and significant decisions.
 7. Unusual events (see special reports).
 8. Stoppages, delays, shortages, and losses.
 9. Meter readings and similar recordings.
 10. Emergency procedures.
 11. Orders and requests of authorities having jurisdiction.
 12. Change Orders received and implemented.
 13. Construction Change Directives received and implemented.
 14. Services connected and disconnected.
 15. Equipment or system tests and startups.
 16. Partial completions and occupancies.
 17. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.06 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.01 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Scheduling Consultant: Engage a consultant to provide planning, evaluation, and reporting using CPM scheduling.
- B. In-House Option: Owner may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
1. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- C. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate final completion percentage for each activity.

- D. Distribution: Distribute copies of approved schedule to Architect Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

3.02 CONSTRUCTION PHOTOGRAPHS

- A. Photographer: Engage a qualified professional commercial photographer to take electronic construction photographs.
- B. Minimum Digital Camera Resolution: 1800 x 1200 dpi (dots per inch) @ 72 dpi resolution.
- C. Approved Electronic File Format: jpg, .tif., .tiff., .tga., .jpe., or .png.
- D. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- E. Image File Naming Convention (separate by an underscore _):
 - 1. Project Job Number / Year-Month-Day / Image Number. file extension
- F. Preconstruction Photographs: Before starting construction, take 4 photographs of Project site and surrounding properties from different vantage points, as directed by Architect. Show existing conditions adjacent to property. Submit prints and CD ROMs with digital files as required under "Submittals" Article.
- G. Periodic Construction Photographs: Take 8 photographs monthly, coinciding with cutoff date associated with each Application for Payment. Photographer shall select vantage points to best show status of construction and progress since last photographs were taken. Submit prints and CD ROMs with digital files as required under "Submittals" Article.
 - 1. Field Office Prints: In addition to prints required to be submitted under "Submittals" Article, make and retain in field office at Project site available at all times for reference, one set of prints of periodic construction photographs. Identify photographs the same as for those submitted to Architect.
- H. Final Completion Construction Photographs: Take 12 photographs after date of Substantial Completion for submission as Project Record Documents. Architect will direct photographer for desired vantage points. Submit prints and CD ROMs with digital files as required under "Submittals" Article.

END OF SECTION 01 3200

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SECTION 01 4000 QUALITY REQUIREMENTS

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

1.02 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Architect.
- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL (Nationally Recognized Testing Laboratories), an NVLAP (National Voluntary Laboratory Accreditation Program), or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source, e.g., plant, mill, factory, or shop.
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction and with the qualification requirements of individual specification section governing their work.

1.03 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements to Architect for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.04 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified full-time personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may be the Project superintendent or be an individual with no other Project responsibilities, as accepted by the Architect.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - 3. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority when Commissioning is included in the Project.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.
- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results, including Owner acceptance of nonconforming work. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.05 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.

5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Statement whether conditions, products, and installation exceed manufacturer's statements.
 8. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections.

1.06 INCLUDE THE FOLLOWING:

- A. Name, address, and telephone number of factory-authorized service representative making report.
- B. Statement that equipment complies with requirements.
- C. Results of operational and other tests and a statement of whether observed performance complies with requirements.
- D. Statement whether conditions, products, and installation will affect warranty.
- E. Other required items indicated in individual Specification Sections.
- F. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.07 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

- D. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mock-ups: Prior to fabrication and installation, build mock-up for each form of construction and finish required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mock-up to comply with the following requirements, using materials indicated for the completed Work:

1. Build mock-up in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.
 - a. Show typical components, attachments to building structure, and requirements of installation.
2. Clean exposed faces of mock-up.
3. Notify Architect seven days in advance of the dates and times when mock-up will be installed.
4. Demonstrate the proposed range of aesthetic effects and workmanship.
5. Protect accepted mock-up from the elements with weather-resistant membrane.
6. Obtain Architect's acceptance of mock-ups before starting fabrication.
7. Maintain mock-ups during construction in an undisturbed condition as a standard for review of the completed Work.
8. Acceptance of mock-ups does not constitute acceptance of deviations from the Contract Documents contained in mock-ups unless such deviations are specifically noted by Contractor, submitted to Architect in writing, and accepted by Architect in writing.
9. Demolish and remove mock-ups when directed by Architect unless accepted to become part of the completed Work.

1.08 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
 3. The owner will contract with a vendor to provide the third-party testing and inspection of:
 - a. Soils density/moisture relationships, gradation, and Atterberg limits
 - b. Concrete compressive strength testing
 - c. Asphalt tests (Marshall)
 - d. Fireproofing thickness/adhesion, density
 - e. Structural steel magnetic particle testing, ultrasonic inspection, field welding, high strength bolt/metal decking inspection, radiographic inspection
 - f. Radiation protection shielding
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including

service connections. Report results in writing as specified in Division 01 Section "Submittal Procedures."

- D. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- E. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- F. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 - 3. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control

1.09 SERVICE THROUGH CONTRACTOR.

- A. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
- B. Do not perform any duties of Contractor.
- C. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 - 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 - 4. Facilities for storage and field curing of test samples.
 - 5. Delivery of samples to testing agencies.
 - 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 - 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- D. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- E. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's construction schedule.
 - 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.
 - a. Prepare in tabular form and include the following:
- F. Specification Section number and title.
- G. Entity responsible for performing tests and inspections.
- H. Description of test and inspection.
- I. Identification of applicable standards.

- J. Identification of test and inspection methods.
- K. Number of tests and inspections required.
- L. Time schedule or time span for tests and inspections.
- M. Requirements for obtaining samples.
- N. Unique characteristics of each quality-control service.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner may engage a qualified to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, and as follows:
 - 1. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 2. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 - 3. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 5. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.

3.02 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas in a manner that eliminates evidence of patching. Comply with the Contract Document requirements for cutting and patching in Division 01 Section "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality control services.

END OF SECTION 01 4000

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SECTION 01 4216 DEFINITIONS

PART 1 GENERAL

1.01 SUMMARY

- A. Other definitions are included in individual specification sections.

1.02 DEFINITIONS

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Project Manual: The book-sized volume that includes the procurement requirements (if any), the contracting requirements, and the specifications.
- E. Provide: To furnish and install.
- F. Supply: Same as Furnish.

PART 2 PRODUCTS - NOT USED

PART 3 EXECUTION - NOT USED

END OF SECTION 01 4216

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**SECTION 01 5000
TEMPORARY FACILITIES AND CONTROLS**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

1.02 INFORMATIONAL SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.
- B. Moisture-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.
 - 3. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- C. Dust- and HVAC-Control Plan at Renovation Work: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.
- D. Temporary Utility Reports: Make available on request, reports of tests, inspections, meter readings, and similar procedures performed on temporary utilities.
- E. Implementation and Termination Schedule: Make available on request a schedule indicating implementation and termination of each temporary utility.

1.03 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6 "Requirements for Demolition Operations", NECA's "Temporary Electrical Facilities," and NFPA 241 "Standard for Safeguarding Construction, Alteration, and Demolition Operations".
 - 1. Trade Jurisdictions: Assigned responsibilities for installation and operation of temporary utilities are not intended to interfere with trade regulations and union jurisdictions.
- B. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- C. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- D. Accessible Temporary Egress at Renovation Work: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.
- E. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to, the following:
 - 1. Building Code requirements.
 - 2. Health and safety regulations.

3. Utility company regulations.
4. Police, Fire Department and Rescue Squad rules.
5. Environmental protection regulations.
6. City ordinances and regulations.

1.04 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Provide new materials. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Polyethylene Sheet: Reinforced, fire-resistive sheet, 6 mil (0.14 mm) minimum thickness, with Class A flamespread rating per ASTM E 84 and passing NFPA 701 Test Method 2.
 1. Basis of Design (Product Standard): Abatement Technologies, Inc.; SAFE-FLEX ICRA Awareness Barrier.
- C. Dust Containment Barrier for Doors: reinforced, fire-resistive polyethylene sheet, 10 mil (0.25 mm) minimum thickness with Class B flame-spread rating per ASTM E 84 and designed to be used for securing temporary construction doors so as to minimize and mitigate particle control during construction.
 1. Basis of Design (Product Standard): Abatement Technologies, Inc.; Aire Guardian Door Guard Reusable Barrier.
- D. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (900 by 1500 mm).
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively.

2.02 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
- C. Store combustible materials apart from building.

2.03 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation, or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- C. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- D. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.

2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- E. Air-Filtration Units for Renovation Work: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.01 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.02 TEMPORARY UTILITY INSTALLATION

- A. Locate temporary utilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify utilities as required.
- B. Provide each utility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until utilities are no longer needed or are replaced by authorized use of completed permanent utilities.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with requirements of authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
 1. Existing Toilets in Occupied Facilities: Use of Owner's existing toilet facilities will not be permitted or allowed.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.
 - b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
- F. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.

3.03 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Locate field offices, storage sheds, sanitary facilities, and other temporary construction and support facilities for easy access.
 - 2. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Parking: Coordinated parking with Owner's requirements.
- C. Project Signs: Coordinated signs with Owner's requirements and requirements of authorities having jurisdiction.
- D. Waste Disposal Facilities: Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."
- E. Comply with progress cleaning requirements in Division 01 Section "Execution."
- F. Existing Elevator Use in Occupied Facilities: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- G. Existing Stair Usage in Occupied Facilities: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- H. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.04 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Infection Control Risk Assessment Requirements: Operate temporary facilities, construct temporary containment barriers and in all other ways comply with Infection Control Risk Assessment Report. The Infection Control Risk Assessment Report includes specific requirements of the Contractor.
- C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 01 Section "Summary."
- D. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using environmentally safe materials.

- E. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- F. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- G. Temporary Enclosures: Provide temporary, weathertight, enclosures for protection of construction, in progress and completed, including, but not limited to, vertical and horizontal openings, from exposure, foul weather, other construction operations, and similar activities.
- H. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas from fumes and noise.
 - 1. Construct dustproof partitions with 1/2"x4'x8' Eucalyptus White Hardboard with joints taped on occupied side, and fire retardant-treated plywood on construction operations side.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1200 mm) between doors. Maintain walk-off mats in vestibule, for dust control.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 - 3. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 - 4. Protect air-handling equipment.
 - 5. Provide walk-off mats at each entrance through temporary partition.
- I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241 and authorities having jurisdiction; manage fire-prevention program.

3.05 MOISTURE CONTROL

- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of discoloration that may appear during construction.
- B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Use permanent HVAC system to control humidity.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits. Refer to technical specification sections for additional and more stringent criteria.

3.06 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Maintain markers for underground lines. Protect from damage during excavation operations.

- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor.
 - 2. Remove temporary roads and paved areas not intended for or approved for integration into permanent construction. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 - 3. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01 Section "Closeout Procedures."

END OF SECTION 01 5000

**SECTION 01 6000
PRODUCT REQUIREMENTS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Re-use of existing products.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Procedures for Owner-supplied products.
- F. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 1000 - Summary: Identification of Owner-supplied products.
- B. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- C. Section 01 4000 - Quality Requirements: Product quality monitoring.
- D. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.
- E. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 SUBMITTALS

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

PART 2 PRODUCTS

2.01 EXISTING PRODUCTS

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.
- B. Unforeseen historic items encountered remain the property of the Owner; notify Owner promptly upon discovery; protect, remove, handle, and store as directed by Owner.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
 - 1. Made outside the United States, its territories, Canada, or Mexico.
 - 2. Made using or containing CFC's or HCFC's.
 - 3. Made of wood from newly cut old growth timber.
 - 4. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
 - 1. If used on interior, have lower emissions, as defined in Section 01 6116.

2. If wet-applied, have lower VOC content, as defined in Section 01 6116.
3. Are made of recycled materials.
4. If made of wood, are made of sustainably harvested wood, wood chips, or wood fiber.
5. Have a published Health Product Declaration (HPD).

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 OWNER-SUPPLIED PRODUCTS

- A. See Section 01 1000 - Summary for identification of Owner-supplied products.
- B. Owner's Responsibilities:
 1. Arrange for and deliver Owner reviewed shop drawings, product data, and samples, to Contractor.
 2. Arrange and pay for product delivery to site.
 3. On delivery, inspect products jointly with Contractor.
 4. Submit claims for transportation damage and replace damaged, defective, or deficient items.
 5. Arrange for manufacturers' warranties, inspections, and service.
- C. Contractor's Responsibilities:
 1. Review Owner reviewed shop drawings, product data, and samples.
 2. Receive and unload products at site; inspect for completeness or damage jointly with Owner.
 3. Handle, store, install and finish products.
 4. Repair or replace items damaged after receipt.

3.03 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.04 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 7419.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Provide off-site storage and protection when site does not permit on-site storage or protection.
- H. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- I. Comply with manufacturer's warranty conditions, if any.
- J. Do not store products directly on the ground.
- K. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- L. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- M. Prevent contact with material that may cause corrosion, discoloration, or staining.
- N. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- O. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION 01 6000

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SECTION 01 6116
VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Requirements for Indoor-Emissions-Restricted products.
- B. Requirements for VOC-Content-Restricted products.

1.02 RELATED REQUIREMENTS

- A. Section 01 3000 - Administrative Requirements: Submittal procedures.
- B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.
- C. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

1.03 DEFINITIONS

- A. Indoor-Emissions-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
 - 3. Flooring.
 - 4. Composite wood.
 - 5. Products making up wall and ceiling assemblies.
 - 6. Thermal and acoustical insulation.
- B. VOC-Content-Restricted Products: All products in the following product categories, whether specified or not:
 - 1. Interior paints and coatings applied on site.
 - 2. Interior adhesives and sealants applied on site, including flooring adhesives.
- C. Interior of Building: Anywhere inside the exterior weather barrier.
- D. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.
- E. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.
- F. Inherently Non-Emitting Materials: Products composed wholly of minerals or metals, unless they include organic-based surface coatings, binders, or sealants; and specifically the following:
 - 1. Concrete.
 - 2. Clay brick.
 - 3. Metals that are plated, anodized, or powder-coated.
 - 4. Glass.
 - 5. Ceramics.
 - 6. Solid wood flooring that is unfinished and untreated.

1.04 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2018).
- C. CAL (CDPH SM) - Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions From Indoor Sources Using Environmental Chambers; 2017, v1.2.
- D. CARB (ATCM) - Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products; Current Edition.

- E. CARB (SCM) - Suggested Control Measure for Architectural Coatings; California Air Resources Board; 2020.
- F. CHPS (HPPD) - High Performance Products Database; Current Edition.
- G. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.
- H. SCAQMD 1113 - Architectural Coatings; 1977, with Amendment (2016).
- I. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).
- J. SCS (CPD) - SCS Certified Products; Current Edition.
- K. UL (GGG) - GREENGUARD Gold Certified Products; Current Edition.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

1.06 QUALITY ASSURANCE

- A. Indoor Emissions Standard and Test Method: CAL (CDPH SM), using Standard Private Office exposure scenario and the allowable concentrations specified in the method, and range of total VOC's after 14 days.
 - 1. Wet-Applied Products: State amount applied in mass per surface area.
 - 2. Paints and Coatings: Test tinted products, not just tinting bases.
 - 3. Evidence of Compliance: Acceptable types of evidence are the following;
 - a. Current UL (GGG) certification.
 - b. Current SCS (CPD) Floorscore certification.
 - c. Current SCS (CPD) Indoor Advantage Gold certification.
 - d. Current listing in CHPS (HPPD) as a low-emitting product.
 - e. Current CRI (GLP) certification.
 - f. Test report showing compliance and stating exposure scenario used.
 - 4. Product data submittal showing VOC content is NOT acceptable evidence.
 - 5. Manufacturer's certification without test report by independent agency is NOT acceptable evidence.
- B. VOC Content Test Method: 40 CFR 59, Subpart D (EPA Method 24), or ASTM D3960, unless otherwise indicated.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Report of laboratory testing performed in accordance with requirements.
- C. Composite Wood Emissions Standard: CARB (ATCM) for ultra-low emitting formaldehyde (ULEF) resins.
 - 1. Evidence of Compliance: Acceptable types of evidence are:
 - a. Current SCS "No Added Formaldehyde (NAF)" certification; www.scs-certified.com.
 - b. Report of laboratory testing performed in accordance with requirements.
 - c. Published product data showing compliance with requirements.
- D. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.
- B. VOC-Content-Restricted Products: VOC content not greater than required by the following:
 - 1. Adhesives, Including Flooring Adhesives: SCAQMD 1168 Rule.
 - 2. Joint Sealants: SCAQMD 1168 Rule.
 - 3. Paints and Coatings: Each color; most stringent of the following:

- a. 40 CFR 59, Subpart D.
- b. SCAQMD 1113 Rule.
- c. CARB (SCM).

PART 3 EXECUTION

3.01 FIELD QUALITY CONTROL

- A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.
- B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

END OF SECTION 01 6116

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SECTION 01 7300 EXECUTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. Installation of the Work.
 - 4. Cutting and patching.
 - 5. Coordination of Owner-installed products.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.

1.02 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

1.03 SUBMITTALS

- A. Qualification Data: For land surveyor or professional engineer.
- B. Certificates: Submit certificate signed by land surveyor or professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 3. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 4. Dates: Indicate when cutting and patching will be performed.
 - 5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - a. Include description of provisions for temporary services and systems during interruption of permanent services and systems.
 - 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 - 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.
- D. Retention System Certification: Submit a statement certified by the Contractor's registered structural engineer that the design of components of the excavation support system is in compliance with provisions of the Contract Documents and the local building code, and is in keeping with generally accepted engineering practice.

1. Submit, if requested, design calculations, specifications and erection drawings, bearing the Contractor's registered structural engineer's stamp, to the local building code official.
2. Submit complete excavation support system shop drawings for information coordination purposes only.
3. Architect/Engineer will neither review nor approve excavation support system shop drawings.

1.04 QUALITY ASSURANCE

- A. Retention System Engineering: Each component of the excavation support system shall be designed by a registered structural engineer, in accordance with the local building code, and registered structural engineer shall be engaged by the Contractor.
- B. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 3. Miscellaneous Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
 - a. If possible, retain original Installer or fabricator to cut and patch exposed Work listed below. If it is impossible to engage original Installer or fabricator, engage another recognized, experienced, and specialized firm.
- C. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- D. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.05 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Division 01 sustainable construction requirements Section.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

3.02 INSTALLATION, GENERAL

- A. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified:
 - 1. Respective manufacturer/fabricator's written installation instructions.
 - 2. Accepted submittals.
 - 3. Contract Documents.
- B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3.03 PREPARATION

- A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.
- B. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- C. Existing Utility Interruptions at Renovation Work: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
 - 1. Notify Owner not less than 72 hours in advance of proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Owner's written permission.
- D. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- E. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- F. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Architect according to requirements in Division 01 Section "Project Management and Coordination."

3.04 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.05 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated, unless indicated otherwise in the Contract Documents.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located, aligned, and coordinated with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.06 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching according to requirements in Division 01 Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 - b. Patch fire rated assemblies with materials to match existing and maintain assembly fire rating.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.07 OWNER-INSTALLED PRODUCTS

- A. Site Access: As applicable, provide access to Project site for Owner's construction personnel.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.
1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.08 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold waste materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F (27 deg C).
 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers specifically intended for holding types of waste materials identified where applicable, e.g. blue colored containers with labeling and symbols for bio-waste.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
1. Remove liquid spills immediately.
 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls." and Division 01 Section "Construction Waste Management and Disposal", whichever is the more restrictive.
- H. Remove construction markings not required and graffiti immediately, repairing or replacing damaged material.

- I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.09 STARTING AND ADJUSTING

- A. As applicable, coordinate startup and adjusting of equipment and operating components with commissioning requirements in Division 01 specification sections.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01 Section "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 01 7300

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**SECTION 01 7419
CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging and/or recycling nonhazardous demolition and construction waste.
 - 2. Disposing of nonhazardous construction waste.

1.02 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. 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.
- C. Salvage / Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

1.03 SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for commencement of the Work.
- B. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons (tonnes).
 - 4. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
 - 5. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- C. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- D. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- E. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Submittal: Letter signed by Contractor, tabulating total waste material, quantities diverted and means by which it is diverted, and statement that requirements have been met.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
 - 1. Review and discuss waste management plan.
 - 2. Review requirements for documenting quantities of each type of waste and its disposition.
 - 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 - 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.

5. Review waste management requirements for each trade.

1.05 WASTE MANAGEMENT PLAN

- A. General: Develop a waste management plan according to ASTM E 1609 and requirements of this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.
- B. Waste Identification: Indicate anticipated types and quantities of site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 1. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 2. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 3. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location on Project site where materials separation will be located.
- D. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there was no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
 1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include hauling and tipping fees and cost of collection containers for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged / recycled materials.
 5. Savings in hauling and tipping fees that are avoided.
 6. Handling and transportation costs. Include cost of collection containers for each type of waste.
 7. Net additional cost or net savings from waste management plan.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 1. Comply with Division 01 Section "Temporary Facilities and Controls" for operation, termination, and removal requirements.
- B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 2. Comply with Division 01 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.02 RECYCLING CONSTRUCTION WASTE

- A. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.

3.03 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate onsite.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.
- C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01 7419

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**SECTION 01 7700
CLOSEOUT PROCEDURES**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
 - 6. Attic stock provisions.

1.02 SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.
- C. Certificates of Release: From authorities having jurisdiction.
- D. Certificate of Insurance: For continuing coverage.
- E. Field Report: For pest control inspection.
- F. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.03 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Divisions 02 through 33 Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Divisions 02 through 33 Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 - 5. Submit test/adjust/balance records.
- C. Procedures Prior to Substantial Completion: Complete the following prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01 Section "Demonstration and Training."
 6. Advise Owner of changeover in heat and other utilities.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements, including touchup painting.
 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Reinspection: Request, in writing, reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for final completion.
- E. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

1.04 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Division 01 Section "Payment Procedures."
 - a. If applicable, the final change order must be executed and included in the final application for payment before final completion can be achieved
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list). Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.05 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: 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

1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Page number.
4. Submit list of incomplete items in the format agreed upon by the Owner and Architect.

1.06 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Partial Occupancy: Submit properly executed warranties within minimum number days, as required by the Contract, of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
 1. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- D. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.01 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 1. Complete the following cleaning operations, as applicable, before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

- d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - f. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - g. Sweep concrete floors broom clean in unoccupied spaces.
 - h. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - i. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - j. Remove labels that are not permanent.
 - k. Remove all graffiti and construction writing.
 - l. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - o. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 01 Section "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Division 01 Section "Temporary Facilities and Controls." and Division 01 Section "Construction Waste Management and Disposal", whichever is the more restrictive and as follows:
- 1. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

3.02 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 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 all lamps and starters to comply with requirements for new fixtures.

C. All Warranties remain in effect.

3.03 ATTIC STOCK PROVISIONS

A. Where applicable, the following quantities of attic stock shall be provided:

1. Carpet 50 LF per 600 SF
2. Carpet base 200 LF
3. Floor & wall tile (restroom) 2 boxes
4. Resilient Flooring 2 boxes
5. Sheet Vinyl 250 SF
6. Rubber base 1 box/110 LF
7. Paint 5 interior colors and 1 exterior color, 6-8 gallons each
8. Ceiling tile 2 types: 4-5 cartons each

END OF SECTION 01 7700

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**SECTION 01 7823
OPERATION AND MAINTENANCE DATA**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.

1.02 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.03 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
- B. Format: Submit operations and maintenance manuals in the following format:
 - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Owner.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
- C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect will comment on whether general scope and content of manual are approved.
- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual prior to commencing demonstration and training.

PART 2 - PRODUCTS

2.01 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.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

- E. 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."

2.02 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name and contact information for Contractor.
 - 6. Name and contact information for Architect.
 - 7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 - 8. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.03 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 Owner'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.

2.04 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Precautions against improper use.
 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.05 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.06 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.

2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.01 MANUAL PREPARATION

- A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
- D. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
1. Do not use original project record documents as part of operation and maintenance manuals.
 2. Comply with requirements of newly prepared record Drawings in Division 01 Section "Project Record Documents."

- G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01 7823

**SECTION 01 7839
PROJECT RECORD DOCUMENTS**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
 - 1. Record Drawings.
 - 2. Record Specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous record submittals.

1.02 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of record Drawings as follows:
 - a. Initial Submittal:
- B. Submit PDF electronic files of scanned record.
- C. Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are approved.
 - 1. Final Submittal:
- D. Submit PDF electronic files of scanned record.
- E. Submit a complete copy of the form provided at the end of this section.
- F. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and contract modifications.
- G. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.
- H. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.

PART 2 - PRODUCTS

2.01 ELECTRONIC PROJECT MANAGEMENT SOFTWARE

- A. Electronic File of Project Record Documents: Provide Architect with an independent electronic archive of accepted project record documents using electronic project management software as defined in Division 01 Section "Project Management and Coordination", in addition to the printed documents described elsewhere in this Section.

2.02 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an approved drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding archive photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.

- c. Depths of foundations below first floor.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
 - 4. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

2.03 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. Note related Change Orders, record Product Data, and record Drawings where applicable.
- B. Format: Submit record Specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

2.04 RECORD PRODUCT DATA

- 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.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.
 - 1. Include record Product Data directory organized by Specification Section number and title, electronically linked to each item of record Product Data.

2.05 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

- B. Format: Submit miscellaneous record submittals as scanned PDF electronic file(s) of marked-up miscellaneous record submittals.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

PART 3 - EXECUTION

3.01 RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for project record document purposes. Post changes and revisions to project record documents as they occur; do not wait until end of Project.
- B. Maintenance of Record Documents and Samples: Store record documents and Samples in the field office apart from the Contract Documents used for construction. Do not use project record documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to project record documents for Architect's reference during normal working hours.

END OF SECTION 01 7839

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**SECTION 01 7900
DEMONSTRATION AND TRAINING**

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.

1.02 SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products.
- B. Qualification Data: For instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

1.03 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- B. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.04 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each

module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
- C. Documentation: Review the following items in detail:
 1. Emergency manuals.
 2. Operations manuals.
 3. Maintenance manuals.
 4. Project record documents.
 5. Identification systems.
 6. Warranties and bonds.
 7. Maintenance service agreements and similar continuing commitments.
 8. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
 9. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
 10. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
 11. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
 12. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.

- d. Procedures for routine cleaning
- e. Procedures for preventive maintenance.
- f. Procedures for routine maintenance.
- g. Instruction on use of special tools.
- 13. Repairs: Include the following:
 - a. Diagnosis instructions.
 - a. Repair instructions.
 - b. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - c. Instructions for identifying parts and components.
 - d. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01 Section "Operations and Maintenance Data."
- B. Set up instructional equipment at instruction location.

3.02 INSTRUCTION

- A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- B. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner with at least seven days' advance notice.
- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- E. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 01 7900

SECTION 02 4100 DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Selective demolition of building elements for alteration purposes.

1.02 RELATED REQUIREMENTS

- A. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.
- B. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.
- C. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.
- D. Section 01 7419 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

PART 3 EXECUTION

2.01 DEMOLITION

- A. Refer to drawing demo plans (Arch, Mech, Plumbing and Electrical)
- B. Remove other items indicated, for salvage, relocation, recycling, and Return to Owner.

2.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
 - 1. Obtain required permits.
 - 2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
 - 3. Provide, erect, and maintain temporary barriers and security devices. See ICRA Requirements.
 - 4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
 - 5. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Protect existing structures and other elements to remain in place and not removed.
 - 1. Provide bracing and shoring.
 - 2. Prevent movement or settlement of adjacent structures.
 - 3. Stop work immediately if adjacent structures appear to be in danger.
- D. ICRA Barriers
 - 1. See ICRA Document in the Appendix
 - 2. Barriers are required to isolate the area of construction from debris and fumes and contaminants.

2.03 EXISTING UTILITIES

- A. Coordinate work with utility companies. Notify utilities before starting work, comply with their requirements, and obtain required permits.
- B. Protect existing utilities to remain from damage.
- C. Do not disrupt public utilities without permit from authority having jurisdiction.
- D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.
- F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.
- G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

2.04 SELECTIVE DEMOLITION FOR ALTERATIONS

- A. Existing construction and utilities indicated on drawings are based on casual field observation and existing record documents only.
 - 1. Verify construction and utility arrangements are as indicated.
 - 2. Report discrepancies to Architect before disturbing existing installation.
 - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Remove existing work as indicated and required to accomplish new work.
 - 1. Remove items indicated on drawings.
- C. Protect existing work to remain.
 - 1. Prevent movement of structure. Provide shoring and bracing as required.
 - 2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
 - 3. Repair adjacent construction and finishes damaged during removal work.
 - 4. Patch to match new work.

2.05 DEBRIS AND WASTE REMOVAL

- A. Remove debris, junk, and trash from site per owner requirements.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION 02 4100

SECTION 06 1000 ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Preservative treated wood materials.
- B. Fire retardant treated wood materials.
- C. Miscellaneous framing and sheathing.
- D. Communications and electrical room mounting boards.
- E. Concealed wood blocking, nailers, and supports.
- F. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard; 2022.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2023d.
- D. AWPA U1 - Use Category System: User Specification for Treated Wood; 2022.
- E. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. PS 1 - Structural Plywood; 2009 (Revised 2019).
- G. PS 20 - American Softwood Lumber Standard; 2021.
- H. WWPA G-5 - Western Lumber Grading Rules; 2021.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide technical data on wood preservative materials and application instructions.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Douglas Fir, unless otherwise indicated.
 - 2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
 - 3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
 - 4. Lumber of other species or grades is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Grading Agency: Western Wood Products Association; WWPA G-5.

- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 - 1. Lumber: S4S, No. 2 or Standard Grade.
 - 2. Boards: Standard or No. 3.

2.03 CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

2.04 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

2.05 FACTORY WOOD TREATMENT

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
 - 1. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.
- B. Preservative Treatment:
 - 1. Preservative Pressure Treatment of Lumber Above Grade: AWWA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
 - a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.
- E. Provide the following specific nonstructural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.

7. Chalkboards and marker boards.
8. Wall paneling and trim.
9. Joints of rigid wall coverings that occur between studs.

3.03 INSTALLATION OF CONSTRUCTION PANELS

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
 3. Install adjacent boards without gaps.

END OF SECTION 06 1000

SECTION 07 8400 FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire resistance rated and smoke resistant assemblies, whether indicated on drawings or not.

1.02 RELATED REQUIREMENTS

- A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 01 7000 - Execution and Closeout Requirements: Cutting and patching.
- C. Section 09 2116 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.
- D. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2009 (Reapproved 2016).

1.03 REFERENCE STANDARDS

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2023a.
- B. ASTM E1966 - Standard Test Method for Fire-Resistive Joint Systems; 2015 (Reapproved 2019).
- C. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2023b.
- D. ASTM E2837 - Standard Test Method for Determining the Fire Resistance of Continuity Head-of-Wall Joint Systems Installed between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2023a.
- E. ITS (DIR) - Directory of Listed Products; Current Edition.
- F. FM (AG) - FM Approval Guide; Current Edition.
- G. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.
- H. UL (FRD) - Fire Resistance Directory; Current Edition.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Sustainable Design Submittal: Submit VOC content documentation for nonpreformed materials.
- E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
- F. Certificate from authority having jurisdiction indicating approval of materials used.
- G. Installer's qualification statement.

1.05 QUALITY ASSURANCE

- A. Fire Testing: Provide firestopping assemblies of designs that provide fire ratings when tested in accordance with methods indicated.
 - 1. Listing in UL (FRD), FM (AG), or ITS (DIR) will be considered as constituting an acceptable test report.
 - 2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.

- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section and:
 - 1. Trained by manufacturer.

1.06 FIELD CONDITIONS

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation; maintain minimum temperature before, during, and for three days after installation of materials.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Firestopping Manufacturers:
 - 1. Hilti, Inc; _____: www.hilti.com/#sle.
 - 2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 MATERIALS

- A. Firestopping Materials: Any materials meeting requirements.
- B. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Provide type of materials as required for tested firestopping assembly.

2.03 FIRESTOPPING ASSEMBLY REQUIREMENTS

- A. Perimeter Fire Containment Firestopping: Use system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of floor assembly.
- B. Head-of-Wall (HW) Joint System Firestopping at Joints Between Fire-Rated Wall Assemblies and Non-Rated Horizontal Assemblies: Use system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of wall assembly.
- C. Floor-to-Floor (FF), Floor-to-Wall (FW), Head-of-Wall (HW), and Wall-to-Wall (WW) Joints, Except Perimeter, Where Both Are Fire-Rated: Use system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- D. Through Penetration Firestopping: Use system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
- E. Acoustically Rated Firestopping: Provide system tested in accordance with ASTM E90 with STC rating of 50, minimum.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other materials that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

3.03 INSTALLATION

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
- B. Do not cover installed firestopping until inspected by authorities having jurisdiction.
- C. Install labeling required by code.

3.04 FIELD QUALITY CONTROL

- A. Repair or replace penetration firestopping and joints at locations where inspection results indicate firestopping or joints do not meet specified requirements.

3.05 CLEANING

- A. Clean adjacent surfaces of firestopping materials.

3.06 PROTECTION

- A. Protect adjacent surfaces from damage by material installation.

END OF SECTION 07 8400

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SECTION 07 9005 JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Sealants and joint backing.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping: Firestopping sealants.
- B. Section 09 2116 - Gypsum Board Assemblies: Acoustic sealant.

1.03 REFERENCE STANDARDS

- A. ASTM C834 - Standard Specification for Latex Sealants; 2017 (Reapproved 2023).
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- D. ASTM D1667 - Standard Specification for Flexible Cellular Materials—Poly (Vinyl Chloride) Foam (Closed-Cell); 2022.
- E. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015 (Reapproved 2021).
- F. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements; 1991 (Reapproved 2016).
- G. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics.
- C. Manufacturer's Installation Instructions: Indicate special procedures.

1.06 QUALITY ASSURANCE

- A. Maintain one copy of each referenced document covering installation requirements on site.
- B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.07 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories which fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Gunnable and Pourable Sealants:
 - 1. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
 - 2. Bostik Inc: www.bostik-us.com.
 - 3. Dow Corning Corporation: www.dowcorning.com.

4. Hilti, Inc: www.us.hilti.com.
5. Momentive Performance Materials, Inc (formerly GE Silicones): www.momentive.com.
6. Pecora Corporation: www.pecora.com.
7. Red Devil: www.reddevil.com.
8. Tremco Global Sealants: www.tremcosealants.com.
9. Sherwin-Williams Company: www.sherwin-williams.com.
10. W.R. Meadows, Inc: www.wrmeadows.com.

2.02 SEALANTS

- A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
- B. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
 1. Color: To be selected by Architect from manufacturer's standard range.
 2. Applications: Use for:
 - a. Joints between metal frames and other materials.
 - b. Other exterior joints for which no other sealant is indicated.
- C. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
 1. Color: To be selected by Architect from manufacturer's standard range.
 2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- D. Concrete Floor Joint Filler: Self-leveling, pourable, semi-rigid sealant intended for filling cracks and control joints not subject to significant movement; rigid enough to support concrete edges under traffic.
 1. Composition: Epoxy, single or multi-part, 100 percent solids by weight.
 2. Hardness: 75 to 80 after 7 days, when tested in accordance with ASTM D2240 Shore A.
 3. Color: To be selected by Architect from manufacturer's standard colors.
 4. Joint Width: 1/8 to 1/4 inch (3 to 6 mm).

2.03 ACCESSORIES

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Install bond breaker where joint backing is not used.
- D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- F. Tool joints concave.
- G. Concrete Floor Joint Filler: Install concrete floor joint filler per manufacturer's written instructions. After floor joint filler is fully cured, shave joint filler flush with top of concrete slab.

3.04 CLEANING

- A. Clean adjacent soiled surfaces.

3.05 PROTECTION

- A. Protect sealants until cured.

END OF SECTION 07 9005

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**SECTION 08 1113
HOLLOW METAL DOORS AND FRAMES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Steel frames for wood doors.
- B. Fire-rated hollow metal frames.

1.02 RELATED REQUIREMENTS

- A. Section 08 7100 - Door Hardware.
- B. Section 099000 - Painting and Coating: Field painting.
- C. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.
- D. NAAMM HMMA 840 - Guide Specifications for Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2024.

1.03 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.

1.04 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least five years of documented experience.
- C. Maintain at project site copies of reference standards relating to installation of products specified.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Store in accordance with NAAMM HMMA 840.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Assa Abloy Ceco, Curries, or Fleming: www.assaabloydss.com/#sle.
 - 2. De La Fontaine Inc: www.delafontaine.com.
 - 3. Republic Doors: www.republicdoor.com.
 - 4. Steelcraft, an Allegion brand: www.allegion.com/us.
 - 5. Technical Glass Products; SteelBuilt Window & Door Systems: www.tgpamerica.com/#sle.
 - 6. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND FRAMES

- A. Requirements for All Doors and Frames:
 - 1. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
 - 2. Hardware Preparation: In accordance with BHMA A156.115, with reinforcement welded in place, in addition to other requirements specified in door grade standard.
 - 3. Finish: Factory primed, for field finishing.

- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with all the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

2.03 STEEL FRAMES

- A. General:
 - 1. Comply with the requirements of grade specified for corresponding door.
 - a. Frames for Wood Doors: Comply with frame requirements in accordance with ANSI/SDI A250.8 (SDI-100), Level 2, 16 gage, 0.053 inch (1.3 mm), minimum thickness.
 - 2. Finish: Factory primed, for field finishing.
- B. Door Frames, Fire-Rated: Full profile/continuously welded type.
- C. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- D. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.04 FINISH MATERIALS

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Verify existing conditions before starting work.
- C. Verify that opening sizes and tolerances are acceptable.
- D. Verify that finished walls are in plane to ensure proper door alignment.

2.05 INSTALLATION

- A. Install in accordance with the requirements of the specified door grade standard and NAAMM HMMA 840.
- B. Coordinate frame anchor placement with wall construction.
- C. Coordinate installation of hardware.

2.06 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16 in (1.5 mm) measured with straight edge, corner to corner.

2.07 ADJUSTING

- A. Adjust for smooth and balanced door movement.

**SECTION 08 1416
FLUSH WOOD DOORS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Flush wood doors; flush configuration; fire-rated, non-rated, and lead-lined.

1.02 RELATED REQUIREMENTS

- A. Section 08 1113 - Hollow Metal Doors and Frames.
- B. Section 08 7100 - Door Hardware.

1.03 REFERENCE STANDARDS

- A. AWI (QCP) - Quality Certification Program; Current Edition.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).
- C. FM (AG) - FM Approval Guide; Current Edition.
- D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.
- F. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.
- G. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.
- H. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.
- I. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Test Reports: Show compliance with specified requirements for the following:
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Specimen warranty.
- G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE

- A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.
- C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.

- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.07 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- C. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Wood Veneer Faced Doors:
 - 1. Eggers Industries: www.eggersindustries.com.
 - 2. Assa Abloy: www.assaabloywooddoors.com
 - 3. Marshfield DoorSystems, Inc: www.marshfeldddoors.com.
 - 4. VT Industries: www.vtindustries.com
 - 5. Substitutions: See Section 01 6000 - Product Requirements.

2.02 DOORS AND PANELS

- A. Doors: Refer to drawings for locations and additional requirements.
 - 1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
 - 2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
 - 1. Provide solid core doors at each location.
 - 2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
 - 3. Smoke and Draft Control Doors: In addition to required fire rating, provide door assemblies tested in accordance with UL 1784 with maximum air leakage of 3.0 cfm per sq ft (0.01524 cu m/s/sq m) of door opening at 0.10 inch wg (24.9 Pa) pressure at both ambient and elevated temperatures for "S" label; if necessary, provide additional gasketing or edge sealing.

2.03 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.
- B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

2.04 DOOR FACINGS

- A. Veneer Facing for Transparent Finish: White birch, veneer grade in accordance with quality standard indicated, plain sliced (flat cut), with book match between leaves of veneer, running match of spliced veneer leaves assembled on door or panel face.
 - 1. Vertical Edges: Same species as face veneer.
 - 2. Stiles: Applied wood edges of same species as faces and covering edges of crossbands; crossband edges of face veneers shall not be visible

2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
 - 1. Provide solid blocks at lock edge for hardware reinforcement.

- 2. Provide solid blocking for other throughbolt hardware.
- C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
- E. Provide edge clearances in accordance with the quality standard specified.
- F. Finish work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 5 - Finishing for grade specified and as follows:
 - 1. Transparent:
 - a. System - 2, Lacquer, Precatalyzed.
 - b. Stain: Match Building Standard (custom color)
 - c. Sheen: Match Building Standard.
- G. Factory finish doors in accordance with approved sample.
- H. Seal door top edge with color sealer to match door facing.

2.06 ACCESSORIES

- A. Astragals for Lead-Lined Double and Fire-Rated Doors: Door manufacturer's standard lead-lined steel astragals, specifically for double doors.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.02 INSTALLATION

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
- B. Use machine tools to cut or drill for hardware.
- C. Coordinate installation of doors with installation of frames and hardware.
- D. Inspection and Certification Required
- E. Follow additional Radiation Shielding Report Requirements

3.03 TOLERANCES

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

3.04 ADJUSTING

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

END OF SECTION 08 1416

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SECTION 08 42 43 – INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

- A. This section includes the following types of intensive care unit/critical care unit (ICU/CCU) entrance doors:
 - 1. Manually operated sliding ICU/CCU entrances.
- B. Related Sections:
 - 1. Division 7 Sections for caulking to the extent not specified in this section.
 - 2. Division 8 Section "Glazing" for materials and installation requirements of glazing for ICU/CCU entrance doors.

1.2 REFERENCES

- A. References: Refer to the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 101 - Life Safety Code.
- B. American National Standards Institute (ANSI) / Builders Hardware Manufacturers Association (BHMA).
 - 1. ANSI Z97.1 Standards for Safety Glazing Material Used in Buildings.
- C. American Society for Testing and Materials (ASTM).
 - 1. ASTM B221 Standard Specification for Aluminum and Aluminum Alloy Extruded Bars, Rods, Wire, Profiles and Tubes.
 - 2. ASTM B209 Standard Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- D. American Architectural Manufacturers Association (AAMA).
 - 1. AAMA 611 Voluntary Specification for Anodized Architectural Aluminum.
- E. National Association of Architectural Metal Manufacturers (NAAMM).
 - 1. Metal Finishes Manual for Architectural Metal Products.
- F. International Code Council (ICC).
 - 1. [IBC: International Building Code Building Code.]
 - 2. [CBC: California Building Code.]

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1.3 PERFORMANCE REQUIREMENTS

SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, fabrication, operational descriptions and finishes.
- B. Shop Drawings: Submit manufacturer's shop drawings, including elevations, sections and details, indicating dimensions, materials, and fabrication of doors, frames, sidelites, anchors, hardware, finish, options and accessories.
- C. Samples: Submit manufacturer's samples of aluminum finish.
- D. Informational Submittals: Manufacturer's product information and applicable sustainability program credits that are available to contribute towards a LEED rated project certification.
 - 1. Credit MR 4.1 and 4.2: Manufacturer's or fabricator's certificate indicating percentage of post-consumer recycled content by weight and pre-consumer recycled content by weight for each Product specified under this Section.
- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door opening installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the entrance and their nearest service representatives. The final copies delivered after completion of the installation test to include spare parts list.
- F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 10 years of documented experience in manufacturing of doors and equipment of similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 5 years documented experience installing and maintenance of units similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Source Limitations for ICU/CCU Entrances: Obtain each type of door, frame, operator and sensor components specified in this Section from a single source, same manufacturer unless otherwise indicated.

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[INSERT ARCHITECTURAL FIRM]

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[INSERT DATE]

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual dimensions of openings to receive ICU/CCU entrances by field measurements before fabrication and indicate on shop drawings.

1.6 COORDINATION

- A. Coordinate sizes and locations of recesses in concrete floors for recessed tracks and thresholds if applicable. Concrete work is specified in Division 03.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. ICU/CCU entrances shall be free of defects in material and workmanship for a period of one (1) year from the date of substantial completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Manufacturer: ASSA ABLOY Entrance Systems, 1900 Airport Road, Monroe, NC 28110. Toll Free (877) SPEC-123. Fax (704) 290- 5555 Website www.assaabloyentrance.us contact: specdesk.na.entrance@assaabloy.com
- B. [Substitutions: Not Permitted.]

2.2 INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCES

- A. ICU/CCU entrances including the following:
 - 1. Sliding panels, sidelites and aluminum frame.
 - 2. Entrance header, guide system and carrier assemblies.
- B. Besam ASSA ABLOY VersaMax® 2.0 ICU/CCU Sliding Door Package (Basis of Design):
 - 1. [Single slide, full breakout, ICU/CCU door system.]
 - a. Operation: Manually operated.
 - b. Configuration: Single slide, two equal panel unit with one operable leaf and one sidelite.
 - c. Minimum Clear Door Opening Width: [41-1/2 inches for 8'-0" unit width.] [44-1/2 inches for 8'-6" unit width.]
 - d. Breakaway Capability: Sliding leaf and sidelite.

**[INSERT PROJECT NAME]
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[INSERT DATE]****2.3 ENTRANCE COMPONENTS****A. Stile and Rail Sliding Panels and Sidelites:**

1. Material: Extruded Aluminum, Alloy 6063-T5 or 6063-T6.
2. Door panels shall have a minimum .125 inch (3.2 mm) structural wall thickness including adjoining perimeter frames where applicable.
 - a. Aluminum extrusions shall allow for a factory installed, slide-in type gasket.
3. Door construction shall be by means of an integrated corner clip with 3/8 inch diameter all-thread through bolt from each stile.
 - a. Face of door stiles shall be flush with adjacent rails and muntin.
4. Glass stops shall be .062 inch (15.8 mm) wall thickness and shall provide security function as a standard by means of a fixed non-removable exterior section with glazing to be performed from the interior only.
5. Vertical Stiles shall be [narrow stile 2-1/8 inch (54 mm).
6. Bottom Rails shall be [4 inch (102 mm).]
7. Intermediate Muntin shall be [1-3/4 inch (45 mm).]
8. Gasketing: Slide-in type, replaceable pile mohair seals.
 - a. Bottom rails shall be provided with a concealed adjustable sweep gasket.
9. Glass: Glazing shall comply with ANSI Z97.1, thickness as indicated.
 - a. Glazing Sliding Panels and Sidelite Panels: [1/4" (6 mm)] tempered glass, unless otherwise specified.
 - 1) Glazing Installation: Dry glazing; wet glazing not allowed.

B. Door Carriers: Manufacturer's standard carrier assembly that allows vertical adjustment.

1. Sliding Panel Door Carriers:
 - a. Roller Wheels: Two heavy duty Delrin roller wheels per wheel assembly, for a total of four (4) roller wheels, 1-7/16 inch (36.51 mm) diameter, per active door leaf for operation over a replaceable aluminum track. Single journal with sealed oil impregnated bearings.
 - b. Two (2) heavy duty self-aligning anti-risers per leaf.

C. Framing Members: Provide ICU/CCU entrances as complete assemblies. Manufacturer's standard extruded aluminum framing reinforced as required to support loads.**D. Header: Extruded aluminum header with a replaceable aluminum track, mounted between the jambs and extending full width of entrance. Header to conceal door operators, carrier assemblies, and roller track; complete with hinged access panel for service and adjustment.**

1. Header Capacity: Capable of supporting active breakout leafs up to maximum of 220 lb (100 kg) per leaf.
2. Header Size: 4-1/2 inches (114.3 mm) wide by 4-1/2 inches (114.3 mm) high.
3. Gasketing: Slide-in type, replaceable pile mohair seals.
4. Header Access: Continuous hinge at top of header allows cover to swing and allow complete access to operator and internal electronic and mechanical assemblies.

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2.4 HARDWARE

- A. Provide manufacturer's standard hardware as required for operation indicated.
 - 1. Breakaway arms and bottom pivot assembly shall allow panels to breakout to 90 degrees. Force to breakout sliding panel adjustable to maximum 50 lbf (222 N).
 - 2. Nurse Assist magnetic catch(s) to retain breakout door and sidelite panels in the closed position.
 - [Positive Latch: Mortise type self-latching hookbolt, BHMA A156.5, Grade 1, with lever handles on each side.]
 - 1) [Lever Style: End of lever to have a return towards door face.]
 - b. [Automatic releasing/latching, concealed magnetic bolt shall allow breakout of sidelite panel(s) when sliding panel in full open position.]
 - c. [Full Breakout Trackless Design: Floor mounted guide track and threshold not allowed.]
 - 1) Breakout from a full open position only.
 - d. [Full Breakout Entrance Guide Track: Floor mounted aluminum guide track(s) adjacent to the sidelite portion of the sliding ICU/CCU entrance.]

2.5 ALUMINUM FINISHES

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. [Anodized Finish:]
 - 1. [AAMA 611, Clear, AA- M12C22A41, Class I, 0.018 mm.]

2.6 EXAMINATION

- A. Examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, wall and floor construction, and other conditions affecting performance.
- B. Proceed only after such discrepancies or conflicts have been resolved.

2.7 INSTALLATION

- A. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure non-movement joints.
- B. Install intensive care unit/critical care unit (ICU/CCU) entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
 - 1. Install surface mounted hardware using concealed fasteners to greatest extent possible.

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2. Set headers, carrier assemblies, tracks, operating brackets and guides level and true to location with anchorage for permanent support.
3. Where aluminum will contact dissimilar metals, concrete, or masonry, protect against galvanic action and corrosion.

2.8 ADJUSTING

- A. Adjust alignment of entrances and hardware for smooth, safe operation with minimum air infiltration.
- B. Verify installation and alignment of all entrance gasketing as required for minimum air infiltration and compliance with specified standards.

2.9 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door installation.
- B. Clean glass and metal surfaces promptly after installation. Remove excess sealants, compounds, dirt and other substances. Repair damages to match original finish.

2.10 DEMONSTRATION

- A. Engage a factory-authorized representative to train Owner's maintenance personnel to adjust, operate, and maintain safe operation of the door.

END OF SECTION

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**SECTION 09 2116
GYPSUM BOARD ASSEMBLIES**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal stud wall framing.
- B. Acoustic insulation.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 8400 - Firestopping: Top-of-wall assemblies at fire-resistance-rated walls.
- B. Section 07 9005 - Joint Sealers: Acoustic sealant.
- C. Section 09 2216 - Non-Structural Metal Framing.
- D. Section 13 4905 X-Ray Radiation Protection

1.03 REFERENCE STANDARDS

- A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2017 (Reapproved 2022).
- B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2018.
- C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2020.
- D. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.
- E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.
- F. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2021.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.
- C. Product Data: Provide data on gypsum board, accessories, and joint finishing system.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.
- E. Test Reports: For stud framing products that do not comply with ASTM C645 or ASTM C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing gypsum board application and finishing with minimum 5 years of documented experience.

PART 2 PRODUCTS

2.01 METAL FRAMING MATERIALS

- A. Manufacturers - Metal Framing, Connectors, and Accessories:
 - 1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
 - 2. Jaimes Industries: www.jaimesind.com/#sle.
 - 3. Marino: www.marinoware.com.
 - 4. Phillips Manufacturing Co: www.phillipsmfg.com/#sle.

5. SCAFCO Corporation: www.scafco.com/#sle.
 6. Substitutions: See Section 01 6000 - Product Requirements.
- B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (L/240 at 240 Pa).
1. Studs: "C" shaped with flat or formed webs with knurled faces **with minimum thickness of 20 GA.**
 2. Runners for Curved Walls: U shaped, flexible contour track. sized to match studs.
 3. Ceiling Channels: C-shaped.
 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
- C. Partition Head To Structure Connections: Provide track fastened to structure with legs of sufficient length to accommodate deflection, for friction fit of studs cut short and fastened as indicated on drawings.
- D. Manufacturers - Gypsum-Based Board:
1. American Gypsum Company: www.americangypsum.com.
 2. CertainTeed Corporation: www.certainteed.com.
 3. Georgia-Pacific Gypsum: www.gpgypsum.com.
 4. Lafarge North America Inc: www.lafargenorthamerica.com.
 5. National Gypsum Company: www.nationalgypsum.com.
 6. PABCO Gypsum: www.pabco gypsum.com.
 7. Temple-Inland Inc: www.templeinland.com.
 8. USG Corporation: www.usg.com.
 9. Substitutions: See Section 01 6000 - Product Requirements.
- E. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
- a. Vertical Surfaces: 5/8 inch (16 mm).
 - b. Ceilings: 5/8 inch (16 mm).
- F. Water-resistant Gypsum Board: Water-resistant gypsum board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
1. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
 2. Type: Type X.
 3. Thickness: 5/8 inch (16 mm).
 4. Edges: Tapered.

2.02 ACCESSORIES

- A. Acoustic Insulation: ASTM C665; preformed glass fiber, friction fit type, unfaced. Thickness: as indicated.
- B. Finishing Accessories: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
1. Special Shapes: In addition to conventional corner bead and control joints, provide U-bead at exposed panel edges.
- C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
 2. Ready-mixed vinyl-based joint compound.
- D. Screws for Attachment to Steel Members Less Than 0.033 inch (0.84 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium plated for exterior locations.
- E. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.84 to 2.84 mm) in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.
- B. Framed Gypsum Board Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Laterally brace entire suspension system.
- C. Studs: Space studs at 16 inches on center (at ___ mm on center).
 - 1. Extend partition framing to structure where indicated and to ceiling in other locations.
 - 2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
 - 3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
- D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.
- E. Blocking: Install mechanically fastened steel channel blocking for support of all:
 - 1. Framed openings.
 - 2. Wall mounted cabinets.
 - 3. Plumbing fixtures.
 - 4. Toilet partitions.
 - 5. Toilet accessories.
 - 6. Wall mounted door hardware.
- F. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- G. Acoustic Sealant: Install in accordance with manufacturer's instructions.
 - 1. Place one bead continuously on substrate before installation of perimeter framing members.
 - 2. Place continuous bead at perimeter of each layer of gypsum board.
 - 3. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

3.03 BOARD INSTALLATION

- A. Comply with ASTM C 840, GA-216, ASTM C 840, GA-216, ASTM C 840, and GA-216. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 - 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Moisture Protection: Treat cut edges and holes in moisture resistant gypsum board with sealant.
 - 1. Not more than 30 feet (10 meters) apart on walls and ceilings over 50 feet (16 meters) long.
- D. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

3.04 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
 - 1. Level 5: Areas specifically indicated.

2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 3. Level 2: Behind cabinetry, and on backing board to receive tile finish.
 4. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.
 5. Level 0: Temporary partitions.
 6. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).
 7. Taping, filling, and sanding is not required at surfaces behind fixed cabinetry.
- B. Where Level 5 finish is indicated, spray apply high build drywall surfacer over entire surface after joints have been properly treated; achieve a flat and tool mark-free finish.

3.05 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

END OF SECTION 09 2116

**SECTION 09 2216
NON-STRUCTURAL METAL FRAMING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Metal partition and soffit framing.
- B. Framing accessories.

1.02 RELATED REQUIREMENTS

- A. Section 07 2100 - Thermal Insulation: Acoustic insulation.
- B. Section 07 8400 - Firestopping: Sealing top-of-wall assemblies at fire-resistance-rated walls.
- C. Section 07 9200 - Joint Sealants: Sealing acoustical gaps in construction other than gypsum board or plaster work.
- D. Section 09 2116 - Gypsum Board Assemblies: Execution requirements for anchors for attaching work of this section.

1.03 REFERENCE STANDARDS

- A. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing; 2020.
- B. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings:
 - 1. Indicate prefabricated work, component details, stud layout, framed openings, anchorage to structure, acoustic details, type and location of fasteners, accessories, and items of other related work.
 - 2. Describe method for securing studs to tracks, splicing, and for blocking and reinforcement of framing connections.
- C. Product Data: Provide data describing framing member materials and finish, product criteria, load charts, and limitations.
- D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum five years documented experience and approved by manufacturer.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Metal Framing, Connectors, and Accessories:
 - 1. CEMCO; ____: www.cemcosteel.com/#sle.
 - 2. ClarkDietrich; ____: www.clarkdietrich.com/#sle.
 - 3. The Steel Network, Inc; ____: www.SteelNetwork.com/#sle.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FRAMING MATERIALS

- A. Fire-Resistance-Rated Assemblies: Comply with applicable code and as indicated on drawings.
- B. Non-Loadbearing Framing System Components: AISI S220; sheet steel, of size and properties necessary for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (L/240 at 240 Pa).
 - 1. Studs: C-shaped with flat faces.

- a. minimum 30 mil thickness.
- 2. Runners: U-shaped, sized to match studs.
- 3. Ceiling Channels: C-shaped.
- 4. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
- C. Non-Loadbearing Framing Accessories:
 - 1. Furring and Bracing Members: Of same material as studs; thickness to suit purpose; complying with applicable requirements of ASTM C754.
 - 2. Fasteners: ASTM C1002 self-piercing self-tapping screws.
 - 3. Acoustic Insulation: As Specified in Section 07 2100.
 - 4. Acoustic Sealant: Acrylic emulsion latex or water-based elastomeric sealant; do not use solvent-based non-curing butyl sealant.

2.03 FABRICATION

- A. Fabricate assemblies of framed sections to sizes and profiles required.
- B. Fit, reinforce, and brace framing members to suit design requirements.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that rough-in utilities are in proper location.

3.02 INSTALLATION OF STUD FRAMING

- A. Extend partition framing to structure where indicated and to ceiling in other locations.
- B. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.
- C. Align and secure top and bottom runners at 24 inches (600 mm) on center.
- D. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.
- E. Align stud web openings horizontally.
- F. Secure studs to tracks using crimping method. Do not weld.
- G. Fabricate corners using a minimum of three studs.
- H. Install double studs at wall openings, door and window jambs, not more than 2 inches (50 mm) from each side of openings.
- I. Coordinate installation of bucks, anchors, and blocking with electrical, mechanical, and other work to be placed within or behind stud framing.
- J. Furring: Install at spacing and locations shown on drawings. Lap splices a minimum of 6 inches (150 mm).

3.03 TOLERANCES

- A. Maximum Variation From True Position: 1/8 inch in 10 feet (3 mm in 3 m).
- B. Maximum Variation From Plumb: 1/8 inch in 10 feet (3 mm in 3 m).

END OF SECTION 09 2216

SECTION 09 5100 ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

1.02 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM C635/C635M - Standard Specification for Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2022.
- C. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019.
- D. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2022.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
- B. Do not install acoustical units until after interior wet work is dry.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate grid layout and related dimensioning.
- C. Product Data: Provide data on suspension system components and acoustical units.
- D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.05 QUALITY ASSURANCE

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.06 FIELD CONDITIONS

- A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acoustic Tiles/Panels:
 - 1. Match Existing
 - 2. No Substitutions.
- B. Suspension Systems:
 - 1. Same as for acoustical units.

2.02 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Ceiling systems designed to withstand the effects of earthquake motions determined according to ASCE 7 for Seismic Design Category D, E, or F and complying with the following:

1. Local authorities having jurisdiction.

2.03 ACOUSTICAL UNITS

- A. Acoustical Panel Ceiling:
 1. Match Existing
 2. ASTM E1264 Classification: Type III, Form 2, Pattern C, E
 3. ATClass A
 4. Surface Color: White.
 5. Edge Detail: SQ-Square
 6. Thickness: 5/8 inch.
 7. Size: 24 by 24 inches (Item No. 2210) OR 24 by 48 inches (Item No. 2410) as designated on drawings
 8. Light Reflectance: 0.84
 9. NRC: 0.55
 10. CAC Min: Item 2210 = 33, Item 2410 =35

2.04 SUSPENSION SYSTEM(S)

- A. Manufacturers:
 1. Same as for acoustical units.
 2. Substitutions: See Section 01 6000 - Product Requirements.
- B. Metal Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with perimeter moldings, hold down clips, stabilizer bars, clips, and splices as required.
- C. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
 1. Profile: Tee; 15/16 inch (24 mm) wide face.
 2. Construction: Double web.
 3. Finish: White painted.
 4. Perimeter Moldings: Same material and finish as grid.
 - a. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
 - b. Size: 2 inch x 2 inch.

2.05 ACCESSORIES

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Hanger Wire: 12 gauge, 0.08 inch (2 mm) galvanized steel wire.
- C. Hold-Down Clips: Manufacturer's standard clips to suit application.
- D. Seismic Clips: Manufacturer's standard clips for seismic conditions and to suit application.
- E. Perimeter Moldings: Same metal and finish as grid.
 1. Angle Molding: L-shaped, for mounting at same elevation as face of grid.
 2. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- F. Acoustical Sealant For Perimeter Moldings: Non-hardening, non-skinning, for use in conjunction with suspended ceiling system.
- G. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, ASTM C636/C636M, ASTM E580/E580M, ASTM C636/C636M, and ASTM E580/E580M and as supplemented in this section.
- B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- D. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Use longest practical lengths.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Suspension System, Non-Seismic: Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Seismic Suspension System, Seismic Design Categories D, E, F: Hang suspension system with grid ends attached to the perimeter molding on two adjacent walls; on opposite walls, maintain a 3/4 inch (19 mm) clearance between grid ends and wall.
- H. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- I. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- J. Support fixture loads using supplementary hangers located within 6 inches (152 mm) of each corner, or support components independently.
- K. Do not eccentrically load system or induce rotation of runners.
- L. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
 - 1. Install in bed of acoustical sealant.
 - 2. Use longest practical lengths.
 - 3. Overlap corners.
 - 4. **Rivet fasteners are NOT allowed.**

3.03 INSTALLATION - ACOUSTICAL UNITS

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Lay directional patterned units with pattern parallel to longest room axis.
- D. Fit border trim neatly against abutting surfaces.
- E. Install units after above-ceiling work is complete.
- F. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- G. Cutting Acoustical Units:
 - 1. Cut to fit irregular grid and perimeter edge trim.
 - 2. Make field cut edges of same profile as factory edges.
 - 3. Double cut and field paint exposed reveal edges.
- H. Where round obstructions occur, provide preformed closures to match perimeter molding.

3.04 TOLERANCES

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION 09 5100

**SECTION 09 6500
RESILIENT FLOORING**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Resilient sheet flooring.
- B. Installation accessories.

1.02 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Shop Drawings: Indicate seaming plans and floor patterns.
- D. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.
- E. Verification Samples: Submit two samples, 12 by 12 inch (___ by ___ mm) in size illustrating color and pattern for each resilient flooring product specified.
- F. Certification: Prior to installation of flooring, submit written certification by flooring manufacturer and adhesive manufacturer that condition of subfloor is acceptable.
- G. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.03 DELIVERY, STORAGE, AND HANDLING

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).
- D. Protect roll materials from damage by storing on end.
- E. Do not double stack pallets.

1.04 FIELD CONDITIONS

- A. Store materials for not less than 48 hours prior to installation in area of installation at a temperature of 70 degrees F (21 degrees C) to achieve temperature stability. Thereafter, maintain conditions above 55 degrees F (13 degrees C).

PART 2 PRODUCTS

2.01 SHEET FLOORING

- A. Vinyl Sheet Flooring: Color and pattern throughout wear layer thickness, with backing.
 - 1. Manufacturers:
 - 2. Match existing
 - 3. Seams: Heat welded.
 - 4. Integral coved base with cap strip where required on Drawings.
 - a. Height: 6-inches.
 - 5. Color: match existing.
- B. Vinyl Welding Rod: Solid vinyl bead produced by manufacturer of vinyl flooring for heat welding seams, in color matching field color.

2.02 ACCESSORIES

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.

- B. Primers, Adhesives, and Seam Sealer: Waterproof; types recommended by flooring manufacturer.
- C. Moldings, Transition and Edge Strips: Same material as flooring.
- D. Filler for Coved Base: Plastic.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

3.02 PREPARATION

- A. Remove subfloor ridges and bumps. Fill minor low spots, cracks, joints, holes, and other defects with subfloor filler to achieve smooth, flat, hard surface.
- B. Prohibit traffic until filler is fully cured.

3.03 INSTALLATION - GENERAL

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

3.04 INSTALLATION - SHEET FLOORING

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.
- B. Lay flooring with tightly butted seams, without any seam sealer unless otherwise indicated.

3.05 CLEANING

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

3.06 PROTECTION

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

END OF SECTION 09 6500

**SECTION 09 9000
PAINTS AND COATINGS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints and other coatings.
- C. Scope: Finish all interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
 - 1. Both sides and edges of plywood backboards for electrical and telecom equipment before installing equipment.
 - 2. Mechanical and Electrical:
 - a. In finished areas, paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
 - 1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
 - 2. Galvanized roof access ladders.
 - 3. Items indicated to receive other finishes.
 - 4. Items indicated to remain unfinished.
 - 5. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
 - 6. Stainless steel, anodized aluminum, bronze, terne, and lead items.
 - 7. Marble, granite, slate, and other natural stones.
 - 8. Floors, unless specifically so indicated.
 - 9. Ceramic and other tiles.
 - 10. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
 - 11. Glass.
 - 12. Concealed pipes, ducts, and conduits.

1.02 DEFINITIONS

- A. Conform to ASTM D16 for interpretation of terms used in this section.

1.03 REFERENCE STANDARDS

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; Current Edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2024.
- C. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. MPI product number (e.g. MPI #47).
 - 3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 - 4. Manufacturer's installation instructions.

- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
 - 3. Allow 30 days for approval process, after receipt of complete samples by Architect.
 - 4. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, factory finished metals, wood cabinets, and wood doors, have been approved.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Paint and Coatings: 1 gallon (4 L) of each color; store where directed.
 - 3. Label each container with color in addition to the manufacturer's label.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.
- B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

1.07 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Minimum Application Temperatures for Latex Paints: 45 degrees F (7 degrees C) for interiors; 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.

1. In the event that a single manufacturer cannot provide all specified products, minor exceptions will be permitted provided approval by Architect is obtained using the specified procedures for substitutions.
 2. Substitution of other products by the same manufacturer is preferred over substitution of products by a different manufacturer.
 3. Substitution of a different paint system using MPI-approved products by the same manufacturer will be considered.
- C. Paints:
1. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- D. Primer Sealers: Same manufacturer as top coats.
- E. Substitutions: See Section 01 6000 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
 3. Supply each coating material in quantity required to complete entire project's work from a single production run.
 4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Primers: As follows unless other primer is required or recommended by manufacturer of top coats; where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
- C. Volatile Organic Compound (VOC) Content:
1. Provide coatings that comply with the most stringent requirements specified in the following:
 - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- D. Colors: As indicated on drawings
1. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
 2. Extend colors to surface edges; colors may change at any edge as directed by Architect.
 3. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under.

2.03 PAINT SYSTEMS - INTERIOR

- A. Paint I-OP - Interior Surfaces Indicated to be Painted, Unless Otherwise Indicated: Including gypsum board and wood.
1. Top Coat(s): Interior Latex.
 2. Semi-Gloss: MPI gloss level 5; use this sheen at all locations.
 3. Top Coat Product(s):
 - a. Sherwin-Williams ProMar 200 Zero VOC Interior Latex. (MPI #43, 44, 52, 54, 144)

2.04 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.

- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- E. Test shop-applied primer for compatibility with subsequent cover materials.
- F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - 1. Gypsum Wallboard: 12 percent.
 - 2. Masonry, Concrete, and Concrete Unit Masonry: 12 percent.
 - 3. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Concrete and Unit Masonry Surfaces to be Painted: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- H. Galvanized Surfaces to be Painted: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- I. Corroded Steel and Iron Surfaces to be Painted: Prepare using at least SSPC-SP 2 (hand tool cleaning) or SSPC-SP 3 (power tool cleaning) followed by SSPC-SP 1 (solvent cleaning).
- J. Uncorroded Uncoated Steel and Iron Surfaces to be Painted: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by hand wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Prime paint entire surface; spot prime after repairs.
- K. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
- L. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

3.03 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's instructions.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- D. Apply each coat to uniform appearance.
- E. Sand wood and metal surfaces lightly between coats to achieve required finish.
- F. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- G. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.
- H. SPRAY APPLICATION NOT PERMITTED IN HOSPITAL APPLICATIONS. ROLL AND BRUSH ONLY.

3.04 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.05 PROTECTION

- A. Protect finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

END OF SECTION 09 9000

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Sherwin Williams Contractor Job Tracking Form

To be included in Contractor Bid Package

Instructions for Contractor:

- Please complete this form with as much information as available
- If you have an assigned Sherwin Williams Sales Representative or a Home store that services, your account please contact them directly with this form
- If you do not have a Sherwin Williams assigned account manager, please email this form to Michael.J.Koncilja@Sherwin.com
- This form must be forwarded to Sherwin Williams prior to the start of any Capital Expenditure Project
- A job account must be assigned for every project

Instructions for Sherwin Williams Employees:

- Upon receiving this form please open a job account for the paint contractor
- The job account must read as follows: Intermountain Healthcare/Name of City/ Project Name
- A job account is strictly required for all IHC related projects
- Upon opening an IHC job account, an email containing the 9 digit job account number is to be sent to Michael.J.Koncilja@Sherwin.com for tracking purposes
- A request for this project to be linked to Parent #5540 will be communicated
- All Purchases associated with said project are to be made on this job account only

Project Tracking Form

Name of Contractor: _____

Sherwin Williams Account number (Existing): _____

IHC Job Account number (To be assigned): _____

Name and Address of IHC related

Project: _____

Name/Store of Sherwin Williams

Contact: _____

Estimated Materials Needed: _____

Estimated Project Start Date: _____

Additional Comments/Needs of Contractor: (I.E renderings needed,
drawdowns required, Special environmental
restrictions.) _____

**SECTION 10 2200
TEMPORARY PARTITIONS**

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Temporary all-purpose partitions. (SwiftWall Pro)

1.02 RELATED SECTIONS

- A. Section 06 10 00 - Rough Carpentry.
- B. Appendix - ICRA Document

1.03 REFERENCES

- A. Comply with all applicable codes and standards.

1.04 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product Data:
 - 1. Manufacturer's data sheets on each product to be used.
 - 2. Preparation instructions and recommendations.
 - 3. Storage and handling requirements and recommendations.
 - 4. Typical installation methods.
- C. Verification Samples: Two representative units of each type, size, pattern, and color.
- D. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
- B. Installer Qualifications: Company specializing in performing work of this section with basic carpentry skills and experience with projects of similar scope and complexity.
- C. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

1.06 PRE-INSTALLATION CONFERENCE

- A. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
- B. Protect from damage due to weather, excessive temperature, and construction operations.

1.08 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.

1.09 WARRANTY

- A. Manufacturer's standard limited warranty unless indicated otherwise.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: SwiftWall Solutions, which is located at: P. O. Box 1601; Midland, MI 48641; Tel: 616-366-4242; Fax: 989-794-6013; Email: request info (sales@swiftwall.com); Web: <https://swiftwall.com>
- B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.02 TEMPORARY PARTITIONS - SWIFTWALL PRO

- A. Basis of Design: SwiftWall Pro temporary partition system as manufactured by SwiftWall. Simple track and panel system with non-hygroscopic ABS, textured finished on both sides of the wall.
- B. Performance Requirements:
 - 1. Fire Rating: ASTM E84 Class C standard, Class A optional.
 - 2. Sound Attenuation: STC 21 rating.
 - 3. Thermal Rating: R-7 value.
 - 4. Tamper Resistant and Anti Ligature
- C. Panels: Composite assembly consisting of a core, skins, and joiners.
 - 1. Skins: ABS. Color: White matte. Finish: Hair cell.
 - a. Fire Rating: ASTM E84 Class C.
 - 2. Skins: Aluminum. Color: White semi-gloss. Finish: Powder coated, smooth.
 - a. Fire Rating: ASTM E84 Class A.
 - 3. Core: Urethane modified polyisocyanurate foam insulation board. R-value: 6.5. Thickness: 1 inch (25 mm).
 - 4. Joiner: Industrial extruded aluminum. Male/female.
 - 5. Panel Sizes.
 - a. As Application Requires
- D. Track: Cut to length as needed.
 - 1. Size (WxHxL): 4 x 2-3/4 x 120 inches (10 x 7 x 305 cm).
 - 2. Material: Industrial extruded aluminum.
 - 3. Finish: Powder Coated. Color: White, gloss.
- E. C-Channel: Cut to length as needed.
 - 1. Size (WxH): 1.2 x 2 inches (3 x 5 cm).
 - 2. Lengths: Manufacturer supplies C-channel lengths to match system requirements.
 - 3. Material: Industrial extruded aluminum.
 - 4. Finish: Powder Coated. Color: White gloss.
- F. Rounded Corner Channel: Cut to length as needed.
 - 1. Size: 3 inch (8 cm) radius
 - 2. Height: Manufacturer supplies corner channel lengths to match system requirements.
 - 3. Material: Industrial extruded aluminum.
 - 4. Finish: Powder Coated. Color: White, semi-gloss.
- G. Adjustable Corner Channel: Full length piano hinge assembly.
 - 1. Range of Motion: 0 to 180 degrees
 - 2. Height: Manufacturer supplies adjustable corner channel lengths to match system requirements.
 - 3. Material: Industrial extruded aluminum.
- H. Single Door:
 - 1. Door Panel Width: 48 inches (122 cm).
 - 2. Door Panel Thickness: 1.1 inches (3 cm).
 - 3. Door Panel Height: To match system panel height.

4. Entryway Size: 36 x 88 inch (91 x 224 cm).
5. Material: Skin, core, and joiner to match panel skin.
6. Hardware: As determined by the owner.
 - a. Tamper resistant, anti-ligature, pick proof
- I. Additional Components: Fasteners, shoring, bracing, safety features, etc., designed by the job site engineer to provide a structurally sound and safe installation of the temporary partition system.
 1. Tamper Resistant, Anti-Ligature, Pick Proof

PART 3 EXECUTION

3.01 EXAMINATION

- A. Do not begin installation until substrates have been properly constructed and prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.

3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
 1. Verify with owner

3.04 FIELD QUALITY CONTROL

- A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.
 1. Must be approved by owner.
- B. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.

3.05 CLEANING AND PROTECTION

- A. Clean products in accordance with the manufacturer's recommendations.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 10 2200

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**SECTION 23 0500
BASIC MECHANICAL REQUIREMENTS**

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Basic requirements common to the work in general of Division 21/22/23 and other Divisions and Sections of the Specification where referenced.
- B. Provide, unless specified otherwise, all labor, materials and equipment necessary for completely finished and operational mechanical systems described and specified under Division 21/22 and other Sections of this Division 23.
- C. Provide all minor incidental items such as offsets, fittings, and accessories required as part of the work even though not specified or indicated.
- D. Inspection: Inspect work preceding or interfacing with work of Division 21/22/23 and report any known or observed defects that affect the Work to the Construction Manager/General Contractor. Do not proceed with the work until defects are corrected.
- E. Existing Utilities: Are indicated as accurately as possible on the Drawings. Close openings and repair damage in acceptable manner to utilities encountered. This Contractor shall be responsible for field surveying all aspects of existing conditions prior to bid date. Change orders will not be issued for a failure to review existing conditions which affect Division 21/22/23 work.

1.2 RELATED WORK

- A. Requirements: Provide Basic Requirements in accordance with the Contract Documents.

1.3 REFERENCES

- A. General:
 - 1. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
 - 2. The date of the standard is that in effect at the date of the Contract Documents, except when a specific date is specified.
 - 3. When required by individual Specification sections, obtain copy of standard. Maintain copy at job site during work until substantial completion.
- B. Schedule of Referenced Organizations: The following is a list of the acronyms of organizations referenced in these Specifications:

ADC	Air Diffusion Council 1000 E. Woodfield Rd. Schaumburg, IL 60173 www.flexibleduct.org
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AGA	American Gas Association 400 No. Capitol St. N.W. Washington, DC 20001 www.aga.org
AMCA	Air Movement and Control Association 30 West University Drive Arlington Heights, IL 60004 www.amca.org
ANSI	American National Standards Institute 1819 L Street N.W. Washington, DC 20036 www.ansi.org
ARI	Air Conditioning and Refrigeration Institute 4301 No. Fairfax Drive. Arlington, VA 22203 www.ari.org
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers 1791 Tullie Circle, N.E. Atlanta, GA 30329 www.ashrae.org
ASME	American Society of Mechanical Engineers Three Park Avenue New York, NY 10016 www.asme.org
ASPE	American Society of Plumbing Engineers 8614 W. Catalpa Ave. Chicago, IL 60656 www.aspe.org
ASSE	American Society of Sanitary Engineering 901 Canterbury Westlake, OH 44145 www.asse-plumbing.org
ASTM	American Society for Testing and Materials 100 Barr Harbor Dr. West Conshohocken, PA 19428 www.astm.org
AWS	American Welding Society 550 N.W. LeJeune Rd. Miami, FL 33126 www.aws.org

AWWA	American Water Works Association 6666 West Quincy Avenue Denver, CO 80235 www.awwa.org
CDA	Copper Development Association 260 Madison Avenue New York, NY 10016 www.copper.org
CISPI	Cast Iron Soil Pipe Institute 5959 Shallow Ford Rd., Suite 419 Chattanooga, TN 37421 www.cispi.org
CS	Commercial Standard of NBS (U.S. Dept. of Commerce, National Institute of Standards and Technology) Government Printing Office Washington, D.C. 20402
CTI	Cooling Technology Institute 530 Wells Fargo Drive Houston, TX 77090 www.cti.org
HI	Hydraulic Institute 6 Campus Drive First Floor North Parsippany, NJ 07054 pumps.org
ICC	International Code Council 5203 Leesburg Pike, Suite 600 Falls Church, VA 22041 www.intlcode.org
IAPMO	International Association of Plumbing and Mechanical Officials 20001 E. Walnut Drive South Walnut, CA 91789 www.iapmo.org
NEBB	National Environmental Balancing Bureau 8575 Grovemont Circle Gaithersburg, MD 20877 www.nebb.org
NEC	National Electric Code (of NFPA)
NEMA	National Electric Manufacturer's Association 1300 N. 17 th Street Rosslyn, VA 22209 www.nema.org

NFPA	National Fire Protection Association One Batterymarch Park P.O. Box 9101 Quincey, MA 02269 www.nfpa.org
NSF	NSF International 789 No. Dixboro Rd. Ann Arbor, MI 48113 www.nsf.gov
OSHA	Occupational Safety Health Administration (U.S. Dept. of Labor) Government Printing Office Washington, D.C. 20402 www.osha.gov
PDI	Plumbing and Drainage Institute 45 Brystal Drive South Easton, MA 02375 www.pdionline.org
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association 4201 Lafayette Center Drive Chantilly, VA 20151 www.smacna.org
UL	Underwriters Laboratories, Inc. 333 Pfingston Rd. Northbrook, IL 60062 www.ul.com

1.4 DEFINITIONS

- A. Specification Language Explanation: These Specifications are of abbreviated, simplified or streamlined type and include incomplete sentences. Omissions of words or phrases such as "the Contractor shall", "in conformity therewith", "shall be", "as noted on the drawings", "a", "the", are intentional. Supply when "NOTE" occurs on Drawings. Supply words "shall be" or "shall" by inference when colon is used with sentences or phrases. Supply words "on the Drawings" by inference when "as indicated" is used with sentences or phrases. Singular words will be interpreted as plural and plural words will be interpreted as singular where applicable and where full context of the Contract Documents so indicates.
- B. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.
- C. Install: Except as otherwise defined in greater detail, term "install" is used to describe operations at Project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.

- D. Provide: Except as otherwise defined in greater detail, term "provide" means furnish and install, complete and ready for intended use, as applicable in each instance.
- E. Indicated: The term "Indicated" is a cross-reference to graphics, notes or schedules on Drawings, to other paragraphs or schedules in the Specifications, and to similar means of recording requirements in contract documents. Where terms such as "shown", "noted", "scheduled", and "specified" are used in lieu of "indicated", it is for purpose of helping reader locate cross-reference, and no limitation of location is intended except as specifically noted.
- F. General Contractor: The term "General Contractor" used in Division 23 and elsewhere in the Contract Documents means the party with whom the Owner has executed the Owner-Contractor Agreement.
- G. Approved Equal: Except as otherwise defined in greater detail, term "approved equal" means that any materials, equipment, work procedures and techniques shall be either addressed on the drawing, specifications or addendum by manufacturer or by detailed material description. When brand names are referenced it implies that only the manufacturers listed are approved. All approved material, equipment, work procedures, and techniques will be noted in the specifications, drawings, or by addendum prior to bid date. Items not approved in this manner will not be considered.

1.5 QUALITY ASSURANCE

- A. Quality Control:
 - 1. Materials and apparatus required for the work to be new and of first-class quality; to be furnished, delivered, erected, connected and finished in every detail; and to be so selected and arranged so as to fit properly into the building spaces. Where no specific kind or quality of material is given, a first-class standard article shall be furnished.
 - 2. Furnish the services of an experienced superintendent, who will be constantly in charge of the installation of the work, together with all skilled workmen, fitters, metal workers, certified welders, plumbers, millwrights, sprinkler fitters, drain layers, helpers, and labor required to unload, transfer, erect, connect, adjust, start, operate and test for each system.
 - 3. Unless otherwise specifically indicated, equipment and materials to be installed in accordance with the recommendations of the manufacturer. This includes the performance of tests as recommended by the manufacturer.
- B. Proof of Performance:
 - 1. Contractor shall provide proof of performance certification of all Mechanical Equipment and Systems to demonstrate that all Mechanical Equipment and Systems are operating to the intent of the design. This proof of performance shall include, but shall not be limited to, actual demonstration of all temperature/pressure control loops, operation of all heating/cooling equipment and other required tests upon request by the Engineer or Owner. A signed certificate from the piping, sheet metal, control, and balancing subcontractors stating that they have personally checked the operation of all equipment and control loops and that everything under their subcontract is operating as specified. These certificates shall be furnished to the 230593 Contractor for inclusion in the Operation and Maintenance Manual.

1.6 REGULATORY REQUIREMENTS

- A. Execute work per Underwriters, Public Utility, Local and State Codes, Ordinances and applicable regulations. Obtain and pay for required permits, inspections, and certificates. Notify Architect of items not meeting said requirements.
- B. Comply with editions of all applicable codes, ordinances and regulations in effect at the time of bid opening including but not necessarily limited to the following:
 - International Mechanical Code
 - International Plumbing Code
 - International Fuel Gas Code
 - International Energy Conservation Code
 - State Department of Health Requirements
 - State Energy Code
 - National Fire Protection Association Standards
 - International Fire Code
 - International Building Code
 - National Electrical Code NFPA-70
 - Jurisdictional County Health Department
 - Jurisdictional City Wastewater Management Division or District
 - Jurisdictional City Water Department
 - Jurisdictional Water Conservation Standards
- C. If discrepancies occur between the Contract Documents and any applicable codes, ordinances, acts, or standards, the most stringent requirements shall apply.
- D. Where hourly fire ratings are indicated or required, provide components and assemblies meeting requirements of the IBC, and listed by Underwriters Laboratories, Inc.

1.7 SUBMITTALS

- A. Submit Samples, Shop Drawings and Product Data as required by various Sections of Division 23 in accordance with The General Conditions of the Contract. The Contractor agrees that these Submittals processed by the Engineer are not Change Orders; that the purpose of these Submittals by the Contractor is to demonstrate to the Engineer that the Contractor understands the design concept, that he demonstrates his understanding by indicating which equipment and material he intends to furnish and install and by detailing the fabrication and installation methods he intends to use. Contractor further agrees that if deviations, discrepancies, or conflicts between these Submittals and the Contract Documents in the form of design drawings and specifications are discovered either prior to or after these Submittals are processed by the Engineer, the Design Drawings and Specifications shall control and shall be followed.
- B. The submittals shall be submitted in a single package with all mechanical equipment for the project enclosed. The submittal shall be in the form of a single PDF file in which all equipment has been electronically bookmarked and all bookmarks have been identified using the equipment tags used on the drawings. Individual PDF files for separate pieces of equipment or specification sections will not be accepted.

- C. Test Reports: Submit certified test reports as required by various Sections of Division 23 showing compliance in accordance with General Conditions of the Contract. Signed copies shall be included in the Operation and Maintenance Manual.
- D. Operating Instructions and Maintenance Data: Prepare and submit printed operating instructions and maintenance data in accordance with Operating and Maintenance Data paragraph in this Section.
- E. Submittals will be reviewed and marked as follows:
 - 1. No Exceptions Taken: No action required.
 - 2. Make Corrections Noted: Correct the submittals per notes by engineer and submit new copies of submittal to contractor for project records. Do not resubmit to engineer.
 - 3. Rejected: Equipment as submitted does not meet requirements of contract documents. Revise and/or clarify per comments and resubmit to engineer.
 - 4. Submittal Not Requested: Submittal not required per specification. Submittal returned with no review.
- F. Note that the submittal review process does not relieve Contractor of responsibility for ensuring that submitted items satisfy all requirements of the Contract Documents.
- G. Site Condition and Coordination:
 - 1. Before any ductwork is fabricated or equipment installed and before running and/or fabricating any lines of piping or ductwork, the Contractor shall provide Architect and Engineer 1/4" scale drawings of all mechanical rooms and main access walkways coordinated with all trades with submitted equipment and verify all other areas to assure himself that they can be run and installed as contemplated in cooperation with Contractors of other Divisions of the Work and the physical constraints of the Structural and Architectural Work and maintain access walkways are clear for maintenance.

1.8 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Substitutions and Prior Approvals: Substitutions and prior approvals will be acceptable only when the proposed substitute has been submitted to the Engineer and approved through an addendum or change order. Request for prior approval shall be submitted a minimum of 10 calendar days prior to bid.
- B. Some materials and equipment are specified by manufacturer and catalog numbers. The manufacturer and catalog numbers are used to establish a degree of quality and style for such equipment and material.
- C. NOTE: When alternate or substitute materials and equipment are used the Contractor is responsible for engineering/redesign costs, space requirements, configurations, performance, changes in bases, supports, structural members and openings in structure, electrical changes and other apparatus and trades that may be affected by their use. Notification of all affected parties is the responsibility of this Contractor.

1.9 PROJECT RECORD DOCUMENTS

- A. General: Comply with Division 1.

B. Job Site Documents: Maintain at the job site, one record copy of the following:

1. Drawings
2. Specifications
3. Addenda
4. Reviewed Product Submittals and Shop Drawings
5. Field Test Records

Do not use record documents for construction purposes. Maintain documents in clean, dry legible condition, apart from documents used for construction.

C. Record Information: Label each document "Record Document". Mark information using red text and red graphics. Keep each record current. Do not permanently conceal any work until required information is recorded.

D. Record following information on Drawings:

1. Dimensioned location of internal utilities and appurtenances concealed in construction.
2. Field changes of dimension and detail.
3. Changes by change order or field order.
4. Details not on original contract drawings.
5. Manufacturer, trade name, catalog number and supplier of each product and item of equipment actually installed shall be indicated on equipment schedules.

E. Record the following information on Specifications:

1. Changes by change order or field order.
2. Other matters not originally specified.

F. Shop Drawings: Maintain shop drawings as record documents recording changes made after review as specified for drawings above.

G. Submittal: At completion of project, deliver record documents to Owner's representative and transmit a copy of signed receipt from Owner to the Engineer.

1.10 OPERATING AND MAINTENANCE DATA

A. The "Operating and Maintenance Manual" (O & M) is a bound compilation of descriptive drawings and data which identify equipment installed at the project site and detail the procedures and parts required to maintain and repair the equipment. Copies of final reviewed submittals shall be included for all equipment items.

B. An electronic PDF file of the manuals is required, as described in Paragraph G below.

C. Organization of the manuals shall follow the recommendations in the current edition of ASHRAE Guidelines.

D. The following information shall appear on the coversheet of the PDF:

1. "Operation and Maintenance Manual"
2. Project Name (and volume number if more than one volume)
3. Project number

4. Building name, number, and street address
5. Holladay Instacare Procedure Rooms
6. Architect's name
7. Engineer's name
8. General Contractor's name
9. Mechanical Contractor's name

E. The manual shall include the following:

1. Alphabetical list of all system components including the name, address, and 24 hour phone number of the company responsible for servicing each item during the first year's operation.
2. Operating instructions for complete system, including emergency procedures for fire or failure of major equipment and procedures for normal starting/operating/shutdown and long term shutdown
3. Maintenance instructions, including valves, valve tag and other identified equipment lists, proper lubricants and lubricating instructions for each piece of equipment and necessary cleaning/replacing/adjusting schedules.
4. All test reports and proof of performance certificates.
5. Manufacturer's data and instruction sheets for each piece of equipment, marked to indicate the plan symbol, model, number, and options installed for each item of equipment furnished and installed on the project. These data sheet shall be accompanied by reviewed submittals that had no exceptions taken to them. Provide original printed material in each book, faxes are NOT acceptable. The serial numbers of each item of equipment installed are to be listed with the model numbers and plan symbols.
 - a. Installation instructions.
 - b. Drawings and specifications (final shop drawings).
 - c. Complete parts lists, and a source of supply for each piece of equipment, marked with model, size, and plan symbol.
 - d. A copy of the reviewed submittals for each piece of equipment, with any/all corrections identified during the submittal process made to the final submittal documents.
 - e. Performance curves and capacity data, marked with model number, size, and plan code.
 - f. Complete "as-builts" wiring and temperature control diagrams. (Shop drawings are not acceptable).
 - g. Lubrication and other preventative maintenance data.
 - h. Equipment warranties.
 - i. The final balance report.
6. Design Intent Document furnished by Engineer.
7. Include a Table of Contents.

F. In addition to the maintenance manual, and keyed to it, the equipment shall be identified and tagged as specified on drawings. Insert a copy of the Equipment List or Equipment Schedules in the manual.

G. Operating and Maintenance Data documents must be provided in digital format as follows:

1. Provide O&Ms in an intuitive format in electronic PDF format. Electronic manual preparation shall be under the direction of an individual or organization that has demonstrated expertise in the preparation of a comprehensive and complete electronic operation and maintenance manual. This is the responsibility of the Division 21/22/23 contractor.
2. PDF to be authored with the latest edition of Adobe Acrobat or equivalent and be in a "non-protected" network accessible format.
3. All information on the PDF shall be printable on 8.5"x11" or 11"x17" plain paper.
4. Capture images using OCR technology such that the user can key word search for information.
5. Provide a hypertext alphabetical index of all equipment and building products. All hypertext shall be blue in color.
6. Provide the electronic PDF files to the Owner.

1.11 DELIVERY, STORAGE AND HANDLING

- A. General: Deliver and store materials and equipment in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size and color.
- B. Protection: Store materials and equipment off the ground and under cover, protected from damage. Maintain caution labels on hazardous materials.
- C. Large Items: Make arrangements with other contractors on the job for introduction into the building of equipment too large to pass through finished openings.
- D. Handling of Materials: Materials shall be handled, sorted and distributed using appropriate handling methods to protect all materials from damage. Dented, rusted, corroded or otherwise damaged materials shall be removed from the project site. Lined ductwork on which the liner becomes wet shall be removed from the project site. Determination of materials deemed unusable or inappropriate for installation shall be made by the Architect/Engineer.

1.12 PROJECT CONDITIONS

- A. Accessibility:
 1. Division 23 Contractor shall be responsible for the adequate clearance hung ceilings for proper installation of his work. He shall cooperate with Contractors of other Divisions of the Work whose work is in the same space and shall advise the Construction Manager/General Contractor of his requirements. Such spaces and clearances shall, however, be kept to the minimum size required.
 2. Division 23 Contractor shall locate all equipment which must be serviced, operated, or maintained in fully accessible positions. Equipment shall include (but not be limited to) valves, controllers, VAV boxes, control valves, balancing valves, and drain points.
- B. Fabrication:
 1. Before any ductwork is fabricated and before running and/or fabricating any lines of piping or ductwork, the Contractor shall assure himself that they can be run as contemplated in cooperation with Contractors of other Divisions of the Work and the physical constraints of the Structural and Architectural Work.

- C. Scaffolding, Rigging and Hoisting:
 - 1. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery into the premises of any equipment and apparatus furnished; remove same from premises when no longer required.

1.13 COORDINATION

- A. General: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.
- B. Utility Interruptions: Coordinate mechanical utility interruptions with the Owner and the Utility Company. Plan work so that duration of the interruption is kept to a minimum.
- C. Cutting and Patching: Section 230529.
- D. Drawings and Specifications: The Mechanical Drawings indicate the general design and arrangement of lines, equipment, systems, etc. Information shown is diagrammatic in character and does not necessarily indicate every required offset, fitting, etc. Do not scale the Drawings for dimensions. Take dimensions, measurements, locations, levels, etc., from the Architectural Drawings and equipment to be furnished.
- E. Each Division 22/23 subcontractor shall coordinate with all other contractors to make certain that any of his equipment, piping or ductwork which is mounted on isolators or flexibly connected does not become "grounded" by another contractors work (e.g. walls, ceiling, etc.).
- F. Coordinate with all subcontractors to maintain adequate access to all equipment for maintenance and for future replacement of equipment.
- G. Discrepancies: Examine Drawings and Specifications for other parts of the work, and if any discrepancies occur between the plans for the work of this Division and the plans for the work of others, report such discrepancies to the Construction Manager/General Contractor and obtain written instructions for any changes necessary.
- H. Order of Precedence: The precedence of mechanical construction documents are as follows:
 - 1. Addenda and modifications to the Drawings and Specifications take precedence over the original Drawings and Specifications.
 - 2. Should there be a conflict within the Specifications or within Drawings of the same scale, or between the Specifications and the Drawings, the more stringent or higher quality requirements shall apply.
 - 3. In the Drawings, the precedence shall be Drawings of larger scale over those of smaller scale, figured dimensions over scaled dimensions and noted materials over graphic indications.
 - 4. Should there be a conflict in dimensions or locations between Mechanical Drawings and Architectural Drawings, the Architectural Drawings shall have precedence.

1.14 START-UP PROCEDURES

- A. Before start-up, each piece of equipment comprising a part of the system shall be checked for proper lubrication, drive rotation, belt tension, proper control sequence, and any other condition which may cause damage to equipment or endanger personnel.
- B. Insure that all control systems are fully operational in automatic mode. Individually test each control loop to make certain it is operating as intended and is communicating properly with other devices.
- C. If systems are not to continue in use following the start-up procedures, steps should be taken to insure against accidental operation or operation by unauthorized personnel. Provide padlocks on disconnect switches where applicable.
- D. Factory personnel shall be notified as appropriate to start systems requiring their services.

1.15 SCHEDULE OF TESTING

- A. Provide testing in accordance with the General Conditions of the Contract.
- B. A schedule of testing shall be drawn up by the Division 23 Contractor in such a manner that it will show areas tested, test pressure, length of test, date, time and signature of testing personnel.
- C. All testing must be performed in the presence of the Architect's/Construction Manager's/General Contractor's representative; his signature for verification of the test must appear on the schedule.
- D. All testing must be performed in accord with the procedures set forth in Division 23 and other Sections of the Specifications where referenced. At completion of testing, the completed schedule shall then be submitted in triplicate to the Architect and a copy shall be forwarded to the 230593 Contractor for inclusion in Operation and Maintenance Manual.
- E. Make all specified tests on piping, ductwork and related systems as specified in this specification.
- F. Make sure operational and performance tests are made on seasonal equipment.
- G. Complete all tests required by Code Authorities, such as smoke detection, life safety, fire protection and health codes.
- H. After test runs have been completed and systems have been demonstrated to be satisfactory and ready for permanent operation, all permanent pipeline strainers and filters shall be cleaned, air filters cleaned or replaced, settings on pressure relief valves properly adjusted, valve and pump packings properly adjusted, belt tensions adjusted, drive guards secured in place, lubrication checked and replenished if required.

1.16 CLEANING AND FINISHING

- A. Provide cleaning in accordance with the General Conditions of the Contract and Division 1.

- B. Cleaning shall include but not be limited to removing grease, dirt, dust, stains, labels, fingerprints and other foreign materials from sight-exposed piping, ductwork, equipment, fixtures and other such items installed under Division 23 of the work. If finishes have been damaged, refinish to original condition and leave everything in proper working order and of intended appearance.
- C. Section 232113 Contractor shall be responsible to certify that all HVAC Piping Systems have been cleaned in accordance with Section 232500 - HVAC Water Treatment whether actually done by the Section 232113 Contractor or by the 232500 Contractor.

1.17 WARRANTIES

- A. Warranty: Provide a written warranty to the Owner covering the entire mechanical work to be free from defective materials, equipment and workmanship for a period of one year after Date of Acceptance. During this period provide labor and materials as required to repair or replace defects. Provide certificates for such items of equipment which have warranties in excess of one year. Submit to the Construction Manager/General Contractor for delivery to the Architect. Include a copy of all warranties in the Operation and Maintenance Manual.
- B. This warranty will be superseded by the terms of any specific equipment warranties or warranty modifications resulting from use of equipment for construction heat or ventilation.

1.18 PROJECT CLOSEOUT

- A. Project Observation Reports:

At or near the completion of the construction phase of this project, the Engineer will generate one or more Project Observation Reports for the owner. These reports will list the items of construction observed by the Engineer which are not in compliance with the Contract Documents.

The Mechanical Contractor and/or subcontractors shall certify completion of each listed item in writing and forward copies to the Architect, Engineer and General Contractor. The Engineer will not recommend the payment of retainage until this compliance certification has been received.

Each item on the Project Observation Report shall have a signature/date in the margin of the report indicating completion of that item.

1.19 CERTIFICATES AND KEYS

- A. Certificates: Upon completion of the work, deliver to the Construction Manager/General Contractor one copy of Certificate of Final Inspection.

END OF SECTION 23 0500

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SECTION 23 0529
BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED WORK

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.

1.2 SYSTEM DESCRIPTION

- A. The work includes, but is not limited to the following:

Materials and methods common to the work in general of Division 23 and other Divisions and Sections of the Specifications where referenced.

1.3 QUALITY ASSURANCE

- A. Welder Qualifications: Welding shall be performed by an ASME Certified welder with current certificate in accordance with ANSI B31.1 for shop and project site welding of piping work. Welder Qualifications:
1. Each welder shall have passed a qualification test within the past 6 months.
 2. The test shall be in accordance with the ASME Boiler and Pressure Vessel Code, Section IX, "Welding Qualifications", ASME Section VIII, and ANSI 313.
 3. The test report shall certify that the welder is qualified to weld the material to be used at the job site.
 4. The Contractor shall submit three copies of each welder's qualification test report to the Project Manager for approval prior to commencing the work. No welder shall be used on the project until so certified.

1.4 REFERENCES

- A. Reference Standards: Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
1. For electrical equipment and products, comply with applicable National Electrical Manufacturers Association (NEMA) Standards, and refer to NEMA Standards for definitions of terminology herein.
 2. Comply with National Electrical Code (NEC) NFPA-70 for electrical installation requirements.
 3. Certified Pipe Welding Bureau (NCPWB) and American National Standards Institute (ANSI) Code Numbers B31.2, & B31.9 as applicable for welding requirements.
 4. Comply with American National Standards Institute (ANSI A13) for identification of piping systems.
 5. Comply with American National Standards Institute (ANSI B31.1) Code for Pressure Piping.

1.5 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract:
 - 1. Legend and color of piping and equipment identification
- B. Certificates: Before proceeding with the Work, submit to the Architect and Owner, two copies of Certification that the welding work will be done according to ANSI B31.1 by welders who have been tested and whose qualification test sheets are available, attesting to their ability to weld in accordance with the Standard Procedure Specifications as established by the National Certified Pipe Welding Bureau.

PART 2 - PRODUCTS

2.1 VALVES

- A. General:
 - 1. Provide valves as specified herein and as indicated on the Drawings complete with accessories and attachments as required and appropriate for the pressure/temperature of system.
 - 2. Supply valves for proper pressure ratings determined by the system working pressures at point of use and of proper types for systems and functions indicated.
 - 3. Provide like type valves of one manufacturer only unless specified otherwise.
 - 4. Provide extended necks as appropriate for insulation.
- B. Manufacturers:
 - 1. The following manufacturers are acceptable providing the product to be considered is equivalent in every respect to the nomenclature provided by the specified make and model.
 - a. Bronze Valves: Powell, Milwaukee, Red-White, Crane, Hammond, Nibco.
 - b. Ball Valves: Hammond, Watts, Jamesbury, Worcester, Milwaukee, Apollo, Powell, Dynaquip, Nibco, Spirax Sarco, FNW.
 - c. Check Valves: Nibco, IFC, DFT, Crane.

2.2 PIPE HANGERS, SUPPORTS, AND ACCESSORIES PROTECTION

- A. General:
 - 1. Provide hangers, rods, clamps, brackets, attachments, inserts, bracing, nuts, coach screws, eye bolts, clips, plates, and washers as required for appropriate installation for building structure provided.
 - 2. All hangers and accessories shall be manufactured by one manufacturer for compatibility of all components.
 - 3. All hangers, attachments, and accessories shall be provided with a certified manufacturer's safety factor of five (5).
 - 4. All hangers, attachments and accessories shall comply with the following:

- a. Safety factor of 5 (actual load vs. ultimate load).
 - b. National Fire Protection Association (NFPA) (except as amended by provisions of this Specification for minimums) and as applicable.
 - c. Factory Mutual Engineering Division (FM) as applicable.
 - d. Manufacturers Standardization Society (MSS).
5. Support and positioning of piping shall be by means of engineered methods that comply with IAPMO PS 42-96.

B. Material:

1. Hangers in contact with steel, iron, cast or ductile iron shall be hot dipped galvanized or cold galvanized with "Galviline by ZRC" cold galvanized compound only to a thickness of not less than 3.0 mil (.003 inches). "Galviline by ZRC Worldwide, Marshfield, MA. Tel: (800) 831-3275, www.zrcworldwide.com" or equal.
2. Hangers in contact with copper piping shall be copper clad or provided with heavy density felt (20 oz.) pad permanently attached to the hanger and placed so as to prevent direct contact between pipe and hanger. Felt shall be mildew and moisture rot-proof. Heavy polyvinyl chloride coating on hanger, 5 mil thickness minimum will be acceptable in lieu of felt.
3. Hangers in contact with "plastic" or "glass" piping shall be galvanized in accordance with Sub-paragraph B-1, above and padded in accordance with Sub-paragraph B-2, above.
4. Hangers for insulated piping shall be sized to accommodate the insulation. Provide with insulation shields or insulation saddles* as applicable and appropriate and in accordance with the following schedule:

Nominal Pipe or Tubing Size	Shield Length	Shield Gauge Thickness	Material
½" thru 3"	12"	18	Galvanized

- * Insulation inserts between piping and shield shall be furnished by 230700 Contractor for appropriate pipe size and insulation thickness for all insulated piping requiring a vapor barrier.
5. Provide swivel ring hangers similar and equivalent to B-Line B-3170, 3170CT, and 3170C for pipe sizes 1/2" thru 8".
 6. Clevis type hangers may, at the Contractors option, be provided when similar and equivalent to B-Line B-3100, and 3100C.
 7. Beam and bar joist clamps shall be appropriate for attachment locations, top beam, bottom beam, etc., and provided with retainer rods, clips or straps as required.
 8. Hanger spacing and minimum rod sizes shall be based on the applicable Mechanical and Plumbing Codes for the type of piping installed.
 9. Riser clamps shall be provided on all vertical risers at each floor and shall conform to materials and protective coatings or pads as specified in Paragraph B of this Article 2.05. Clamps shall be similar and equivalent to B-Line B-3131 and B-3148.
 10. Provide concrete inserts where required in flat slab construction similar and equivalent to B-Line B-22-1 Series 2000 lbs. per foot load capacity and spaced per hanger spacing schedule (sub-paragraph B-9 above) provide all accessories and nuts required.

11. Trapeze hangers shall be constructed of channel similar and equivalent to B-Line Series B-11 thru B-72 as appropriate complete with pipe clamps, nuts, rollers etc., as required. Channel to bear 5 times actual weight of all piping on trapeze system with minimum deflection. (.01 inch maximum). At a minimum, install pipe clamps on every other trapeze hanger, and where required to comply with seismic restraint design.
 12. Wall brackets shall be fabricated "knee" brackets conforming to requirements of sub-paragraph B-12 above and made up with B-Line Series B-11 thru B-72 channel. Angle clips may be used in wood joist construction when similar and equivalent to B-Line B-3060 or 3061.
 13. Hangers attached to wood construction shall be attached by use of eye bolts, coach screws or lag bolts when load bearing ratings maintain a safety factor of 5.
 14. All other means of support i.e., special construction, pipe stands, earthquake bracing, sway bracing, etc., shall be provided as required and in conformance with jurisdictional authority and these Contract Documents, submit all special or required support and bracing systems for review by the Architect/Engineer prior to installing any item.
- All vertical refrigeration suction and hot gas, and all steam piping shall be provided with insulation shields and calcium silicate inserts at each support location.
15. All piping systems exposed to motorized traffic shall be fully protected by installation of concrete-filled pipe bollards. Bollards shall be cleaned and painted as directed by the Architect.
 16. For plenum applications use pipe supports that meet ASTM E-84 25/50 standards.

C. Acceptable Manufacturers:

1. Manufacturers acceptable to this Specification are as follows, all other manufacturers must submit for acceptance.
 - a. B-Line
 - b. Fee & Mason
 - c. Grinnell
 - d. Hubbard Enterprises/HOLDRITE
 - e. P.H.D.
 - f. Michigan
 - g. Tolco
 - h. MAPA
 - i. Hilti
 - j. Caddy

2.3 IDENTIFICATION MATERIALS FOR PIPING AND EQUIPMENT

A. Materials for identification shall be as follows:

1. Metal Tags: Round brass discs, minimum 1-1/2" diameter with edges ground smooth. Each tag shall be punched and provided with brass chains for installation.
2. Engraved Nameplates: Fabricate from plastic sheet stock of sufficient thickness to allow engraved lettering in contrasting color. Attach nameplates to equipment with screws.

2.4 DIELECTRIC PIPE FITTINGS AND ISOLATORS

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
 - 1. Approved Manufacturers: A.Y. McDonald, Capitol, Central Plastics Co, HART Industrial Unions, Jomar, Matco-Norca, Watts, Wilkins, Zurn.
 - 2. Standard: ASSE 1079.
 - 3. Pressure Rating: 150 psig minimum at 180°F.
 - 4. End Connections: Solder-joint copper alloy and threaded ferrous.
- C. Dielectric Flanges:
 - 1. Approved Manufacturers: Capitol, Central Plastics Co, Matco-Norca, Watts, Wilkins, Zurn.
 - 2. Standard: ASSE 1079.
 - 3. Factory-fabricated, bolted, companion-flange assembly, pressure Rating: 150 psig minimum at 180°F. End Connections: Solder-joint copper alloy and threaded ferrous; threaded colder-joint copper alloy and threaded ferrous.
- D. Dielectric-Flange Isolation Kits:
 - 1. Approved Manufacturers: Advance Products & Systems, Calpico, Central Plastics Co., Pipeline Seal and Insulator.
 - 2. Nonconducting materials for field assembly of companion flanges. Pressure Rating: 150 psig minimum.at 180°F. Gasket: Neoprene or phenolic. Bolt sleeves: Phenolic or polyethylene. Washers: Phenolic with steel backing washers.
- E. Dielectric Nipples:
 - 1. Standard: IAPMO PS 66.
 - 2. Electroplated steel nipple complying with ASTM F1545. Pressure rating: 300 psig minimum at 225 °F. End connections: Male threaded or grooved. Lining: Inert and noncorrosive, propylene.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION

- A. General: Unless otherwise specifically indicated on Drawings or in Specifications, install equipment and materials in accordance with recommendations of manufacturer, including performance of tests as manufacturer recommends.
- B. Protection:
 - 1. Close ends of pipe and ductwork during construction and cover equipment to prevent entry of foreign material. Protect insulation against dirt, water, chemical or mechanical damage before, during and after installation. Cover floor drains and protect fixtures and equipment against damage during concrete pours and mechanical work.

C. Quiet Operation and Vibration:

1. All work shall operate in accordance with Section 230540 - Mechanical Sound and Vibration Control under all conditions of load.
2. Sound or vibration conditions not in accordance with Section 230540 and considered objectionable shall be corrected in a manner approved by the Architect under the Work of Division 23.

3.2 WELDING

- A. Joints between sections of pipe, between pipe and fittings, shall be fusion welded. Use only certified welders. Strength of finished welded joints to be equal to strength of pipe. Width of finished weld to be at least 2-1/2 times the thickness of the part joined. Thickness of weld to be at least 25% greater than the thickness of pipe or fittings. Finished welded joints to present neat and workmanlike appearance.
- B. Make no direct welded connections to valves, strainers, apparatus, and related equipment. Make connections to flanged valves, and flanged equipment with welded pipe connection flanges.
- C. Radii of weld ells to be 1-1/2 times nominal diameter of fittings. Fittings used for all branch connections, whether full-size or reducing, to have interior surfaces smoothly contoured. Wall thickness of welded fittings equal to adjacent piping.

3.3 ELECTRIC WIRING

- A. Furnish equipment requiring electrical connections to operate properly and to deliver full capacity at electrical service available.
- B. All control wiring to be in accordance with manufacturer's recommendations; all wiring shall be color coded to facilitate checking.
- C. Unless otherwise indicated, all mechanical equipment motors, starters, and controls shall be furnished, set in place, and wired in accordance with the Electrical Equipment/Wiring Responsibility Matrix on the drawings. Contractor should note that the intent of this electric wiring matrix is to have the Division 23 Contractor responsible for coordinating all control wiring as outlined, whether or not specifically called for by the mechanical or electrical drawings and specifications. Mechanical Contractor shall comply with the applicable requirements of Division 26 for electrical work of this Division 23 which is not otherwise specified. No extras will be allowed for Contractor's failure to provide for these required items. The Division 23 Contractor shall also refer to the Division 26 specifications and plans for all power and control wiring and shall advise the Architect/Engineer of any discrepancies prior to bidding.

ELECTRICAL EQUIPMENT/WIRING RESPONSIBILITY MATRIX

Item	Furnished By*	Set By*	Power Wiring*	Control Wiring*
Equipment Motors	MC	MC	EC	MC

Item	Furnished By*	Set By*	Power Wiring*	Control Wiring*
Motor Starters & Overload Heaters	MC – Except when shown on MCC	EC	EC	MC
Variable Frequency Drives (VFDs)	MC	EC	EC	MC
Fused & Unfused Disconnect Switches, Thermal Overload & Heaters	EC	EC	EC	--
Manual Switches & Speed Control Switches carrying full load currents.	MC	EC	EC	EC
Fire/Smoke and Smoke Dampers	MC	MC	EC – Requires emergency power circuit if air system served is on emergency power.	EC
Control Relays & Transformer (See Note 2)	MC	MC	EC	MC
Thermostats (Line Voltage)	MC	EC	EC	EC
Temperature Control Panels	MC	MC	EC	MC
Building Fire Alarm System Fire & Smoke Detectors, including Relays in Starters for Fan Shutdown.	EC	EC	EC	EC
DDC Interface to Fire Alarm System	MC	MC	EC	MC
Electric Plumbing Fixtures, Sensor Faucets, Sensor Flush Valves, Electric Water Coolers, and required Transformers.	MC	MC	EC	MC
Motor & Solenoid Valves, Damper Motors, PE & EP Switches, Control Valves, Low Voltage Thermostats	MC	MC	MC	MC
Pushbutton Stations & Pilot Lights (manually operated switches not carrying load currents).	MC	MC	N/A	MC
Pushbutton Stations & Pilot Lights carrying fully load current.	MC	EC	EC	N/A
Exhaust fans for kitchen hoods or fume hoods where interlocked with make-up air fans.	MC	MC	EC	EC
Exhaust fans when switched with room lights.	MC	MC	EC	EC
Boiler Controls including Gas Train	MC	MC	EC	MC

Item	Furnished By*	Set By*	Power Wiring*	Control Wiring*
Fire sprinkler system alarms, tamper switches, flow switches and fire alarm systems tie-ins to provide a complete fire protection system.	FPC	FPC	FPC	FPC
Water Softener Timeclocks, Timers, Lock-out Devices, Wheatstone Bridges and Meters	MC	MC	EC	MC
Temporary Heating Connections	MC	MC	EC	MC
Freeze Protection Heat Cable (Heat Trace)	MC	MC	EC	MC
HVAC Water Treatment Interlocks and Glycol Pumps	MC	MC	EC	MC
Fire/Smoke Dampers for all air sources to FM-200 Protected Area 120VAC (Energize Open)	MC	MC	EC – Requires emergency power circuit	EC
FM-200 System Wiring-Panel, Detectors and Local Alarms & Lights	FM	FM	EC – Requires emergency power circuit	FM
Contacts for P.D.U. for Power Shutdown to Equipment in FM-200 Protected Areas	FM	FM	EC	EC
Contacts in FM-200 Panel for Building and Central Station Fire Alarm	FM	FM	EC	EC
Cooling Tower Level Control and Fan Vibration Switch	MC	MC	MC	MC
Cooling Tower Sump Heaters	MC	MC	EC	MC

- * MC = Mechanical Contractor under Division 23 of the work.
- * FM = Mechanical Contractor under Section 212200 - FM-200 Fire Suppression System.
- * FPC = Fire Protection Contractor.
- * EC = Electrical Contractor under Division 26 of the work.
- * MGES = Medical Gas Equipment Supplier (Section 226313).

- D. All temperature control conduit and wiring shall be furnished and installed under Section 230900. All motorized damper and motorized valve wiring shall be furnished and installed under Section 230900.

3.4 SLEEVES, PLATES AND CLOSURES

- A. Division 23 Contractor shall provide and locate pipe sleeves, and inserts required before new floors and walls are built or shall be responsible for the cost of cutting and patching required where sleeves and inserts were not installed or where incorrectly located.
- B. Provide sleeves for mechanical piping passing through concrete floor slabs and through concrete, masonry, tile, and gypsum wall construction. Provide metal collars to close and protect openings.

- C. Where sleeves are placed in exterior walls below grade, pack spaces between the pipe or conduit and the sleeves with Hornflex Thiokol L-32 Sealant or Link Seal and make water-tight. Provide metal rodent collars securely fastened to structure. Link seal shall not be used on fire lines.
- D. Where pipe motion due to expansion and contraction will occur, make sleeves of sufficient diameter to permit free movement of pipe. Where sleeves pass insulated pipes, the sleeves shall be large enough to pass the pipe only and the insulation shall be made to butt against the construction, except for pipes requiring insulation having a vapor barrier, in which case, the sleeves shall be large enough to pass the pipe and insulation. Check floor and wall construction finishes to determine proper length of sleeves for various locations, make actual lengths to suit the following:
 - 1. Terminate sleeves flush with floors, walls, partitions, and ceilings.
 - 2. Seal annular space around pipes watertight at floor penetrations.
 - 3. In areas where pipes are concealed, as in chases, terminate sleeves flush with floor.
 - 4. In all areas where pipes are exposed, extend sleeves 1/4" above finished floor, except in rooms having floor drains, where sleeves shall be extended 2" above floor and in Kitchens and Mechanical Equipment Rooms, where sleeves shall be extended 4" above floor.
- E. Sleeves shall be constructed of 24 gauge galvanized sheet steel with lock seam joints for all sleeves set in concrete floor slabs terminating flush with the floor. All other sleeves shall be constructed of galvanized steel pipe unless otherwise indicated on the drawings. "Crete Sleeve" (plastic type) sleeves are acceptable for concrete construction as manufactured by Sperzel Division, Shamrock Industries or Willoughby Industries.
- F. Fasten sleeves securely in floors and walls so that they will not become displaced when concrete is placed or when other construction is built around them.
- G. Provide tight fitting floor and ceiling plates on pipes passing thru walls, ceilings, and floors. Nickel or chrome plated in finished areas, galvanized cast iron in unfinished areas. Provide wall and ceiling flanges for ducts in finished areas.
- H. Provide all cutting, patching of holes, openings, notches. Obtain written approval for notching, boring, chipping, burning, drilling, welding to structural members in accordance with the General Conditions of the Contract and paragraph 3.5 of this Section.
- I. Where pipe sleeves penetrate fire rated walls and floors, this contractor shall use fire safing to seal openings.

3.5 CUTTING AND PATCHING

- A. Openings in New Construction:
 - 1. Provisions for New Openings: The Division 23 Contractor shall verify all openings required in the new construction in connection with the work under Division 23 with the Architectural and Structural Drawings and shall then meet with and verify same with the General Contractor/Construction Manager who will assign the work to the appropriate contractor to provide all openings in the new construction of the correct size and location in walls, floors or through roofs required for the installation of the mechanical work.

- B. Cutting in New Construction:
 - 1. Failure on the part of the Division 23 Contractor to make the above arrangements for required openings shall cause the cost of cutting and patching for the necessary openings for the installation of his work to be borne by him, either by being assigned to the General Contractor/Construction Manager or in the form of performing the required cutting himself. In either case, all patching shall be done by the appropriate finishing contractor as determined by the General Contractor/Construction Manager. No cutting or drilling of holes shall be done without approval of the Architect/Engineer.
- C. Patching in New Construction:
 - 1. The appropriate finishing contractor as determined by the General Contractor/Construction Manager shall patch all openings in the new structure. All openings made in fire rated walls, floors, or ceilings, shall be patched and made tight to conform to the fire rating for the enclosure. All materials used in patching shall match the materials specified in the Architectural Specifications and all patched areas shall be restored to the specified finish surface to the satisfaction of the Architect.
 - 2. The Division 23 Contractor shall pay the appropriate Finishing Contractor as determined by the General Contractor/Construction Manager for all patching resulting from cutting to accommodate mechanical work.
- D. Cutting in Existing Building:
 - 1. The Construction Manager/General Contractor shall make arrangements for required openings in the existing building to facilitate the passage of ductwork, piping, etc. thru existing floors, walls, and beams. Division 23 Contractor to coordinate all requirements.
- E. Patching in Existing Building:
 - 1. The General Contractor shall patch all existing walls and floors to match existing.

3.6 PIPE HANGERS/SUPPORTS

- A. Use inserts, anchors, expansion bolts or other approved and acceptable means of attachment to concrete construction. Set inserts in advance of concrete installation, provide required reinforcement rod for all inserts carrying loading equivalent of one 4" pipe or more. All inserts shall be flush with face of slab or wall containing insert.
- B. Provide flat square washers for rods thru metal decking with nut above washer, when acceptable and approved.
- C. Cinch hangers to carry appropriate share of loading and slope piping without sags or "pocketing" as appropriate and required.
- D. Rod offsets, or angle installation, plumber tape or wire will not be accepted. Hanger rods shall be true and plumb.
- E. Piping shall not be hung from other piping or equipment items. Provide attachments to building structure only. Use trapeze, wall brackets, knee brackets, etc., where hanger rods cannot be attached within spacing plumb to structures.

- F. Provide sway and earthquake bracing where required in accordance with Section 230548 - Mechanical Seismic Control.

3.7 INSTALLATION OF VALVES

A. General:

1. Provide valves as shown on Contract Documents and as required for pressure relief, balancing and/or control of flow.
2. Provide isolation valves for maintenance and service on each piece of equipment regardless of whether or not shown on Contract Drawings.
3. Provide isolation valves for all branch line take-offs that serve more than two items of fixtures or equipment.
4. Provide balancing valves for each branch of domestic hot water circulating system, all heating/cooling water returns or supplies to equipment, and as shown on Contract Documents.
5. Provide access means for each valve or group of valves either by access panels or utilization of inherent access provided by building methods i.e., lift out ceiling construction or exposed valve installations in non critical areas such as janitor's closets, storage rooms, etc.
6. Install all valves with valve bonnets or operating stems in vertical (upright) position when possible, valves may be installed with bonnets or stems not less than 35 degrees downward from vertical plane except valves on vertical piping may be 90 degrees from vertical plane. Swing type check valves shall be installed on horizontal piping no more than 45 degrees upward slope from horizontal plane, using lift checks on vertical piping. Lift check valves shall not be used on sewage or sump pump discharge piping.
7. Inspect and tighten all bonnet nuts, bolts, packing glands, lubricate all valves requiring lubrication, secure all hand wheels and identification plates, be responsible for all valves having manufacturers name, trade name, working pressure and size stamped or cast into the body of the valve. Perform all maintenance, repacking and inspection prior to installation of valve.

B. Proper Installation of Valves:

1. Provide valves in accordance with the following schedule unless specified otherwise in Contract Documents.
 - a. Dead-end shut off: Gate, ball, butterfly, plug, stop and drain.
 - b. Throttling: Ball, plug, globe, diaphragm, needle, butterfly (when using butterfly valves for throttling, additional valves must be provided for service shutoff.)
 - c. Backflow prevention: Check.
 - d. Water hammer prevention: Silent or pilot operated non slam check.
 - e. Gas piping: Lubricated plug (or ground joint cock up to 1" only), or UL-Listed ball valve.

C. Removal and Repair Provisions:

1. Provide all valves which are not accessible for repair without removal from piping with union connection immediately adjacent to valve outlet.

3.8 PAINTING

- A. Surfaces of exposed equipment and materials to be thoroughly cleaned and left ready for painting in accordance with Architectural Painting Specifications.
- B. Duct interiors visible through registers, grilles and diffusers shall be painted flat black.
- C. Exposed gas piping to be cleaned, primed and two coats of paint (grey).
- D. All other painting of mechanical equipment and piping, unless otherwise noted, shall be performed under other divisions of the work with the exception of identification of piping and equipment which will be the responsibility of the Division 23 Contractor.

3.9 IDENTIFICATION OF PIPING AND EQUIPMENT

- A. General: Provide pipe identification, valve tags, stencils, or engraved nameplates to clearly identify the mechanical equipment, piping and controls of the various mechanical systems and direction of flow in piping.
- B. Methods for identification shall be as follows:
 - 1. Metal Tags: Stamp tags with letter prefixes to indicate service, followed by a number for location in system.
 - 2. Engraved Nameplates: Attach nameplates with brass screws. Pressure-sensitive embossed labels are not acceptable. Nameplates shall bear the same identifying legend used on the Contract Documents.
 - 3. Painted Stencils: Stenciled markings shall be neatly performed with no overspray, drips, or other imperfections. Pipes and equipment to be stenciled shall first be wiped clean of dirt, dust, rust, grease and moisture. Pipes and smooth, hard surface in the area the stencil is to be applied. Paint application shall comply with Architectural Painting Specifications.
Size of Legend and Letters for Stencils:

Insulation or Pipe Diameter	Length of Color Field	Size of Letters
3/4" to 1-1/4"	8"	1/2"
1-1/2" to 2"	8"	3/4"
Ductwork and Equipment	NA	2-1/2"

- 4. Piping Legend and Color (Contractor shall obtain written approval of colors from Owner's representative prior to starting work.)

Legend	Background Color	Direction Arrow	Pressure
Heating Water	Yellow	Arrow	

- 5. Pressure Sensitive Markers: Apply pressure sensitive markers in accordance with manufacturer's recommendations with complete wrap around may be used at Contractor's option. Marker adhesion will be tested for permanence. Any markers showing dog ears, bubbles, or other failings shall be replaced.

6. Semi-Rigid Plastic Identification Markers: Seton Setmark premolded (not pressure sensitive) identification markers may be used at Contractor's option on service piping which is accessible for maintenance operations (but not on piping in finished spaces). This type marker shall not be installed on bare pipe when surface temperature exceeds 180 deg.F unless a 1" thick insulation band is first provided under marker for protection from the hot pipe.
- C. Identification of Piping: Identify all piping accessible for maintenance, above ceilings, utilizing pressure sensitive markers, semi-rigid plastic markers, or stenciled markings according to the following procedures:
1. Use an arrow marker for each pipe-content legend. The arrow shall always point away from the pipe legend and in the direction of flow: color and height of arrow to be same as content legend lettering.
 2. If flow can be in both directions, use a double-headed arrow indication.
 3. Apply pipe legend and arrow indication at every point of pipe entry or exit where line goes thru wall or ceiling cut.
 4. Apply pipe legend and arrow indication within 3" of each valve to show proper identification of pipe contents and direction of flow.
 5. The legend shall be applied to the pipe so that lettering is in the most legible position. For overhead piping, apply legend on the lower half of the pipe where view is unobstructed, so that legend can be read at a glance from floor level.
 6. For pipes under 3/4" O.D., fasten brass tags securely at specified legend locations.
 7. Legend on steam piping, condensate return, compressed air, medical air, gas, and vacuum systems shall include working pressure or vacuum.
 8. Insulated piping equipped with electric heat trace shall additionally be labeled "Electric Traced" with label of same size and color as the pipe legend.
- D. Valves: All valves, including but not limited to domestic hot and cold water, hot water recirculation, heating water, chilled water, condenser water, steam, steam condensate return, fire protection, gas, medical gas, vacuum and special service valves located inside the building, shall be tagged and identified as to type of service, location number, and normal valve position (normally open or normally closed).
- E. Controls: All automatic controls, control panels, zone valves, pressure electric, electric pressure switches, relays, and starters shall be clearly identified.
- F. Lift Out Ceilings: Provide engraved nameplates or black lettering on transparent adhesive labels on ceiling tee stem to identify concealed valves, controls dampers or similar concealed mechanical equipment which is directly above nameplate in ceiling space. Obtain Architect approval before installation.

DIELECTRIC PIPE FITTINGS AND ISOLATORS

- A. Provide dielectric pipe fittings and isolators at all connections between dissimilar metals in the HVAC pipe, and fire protection systems to control corrosion potential caused by galvanic or electrolytic action.
- B. Typical locations for dielectric isolation are; water heaters, storage and pressure tanks, water conditioning equipment, pumps, changes in service piping materials, make-up connections to boilers and chilled water systems, valves, deaerators, flexible connectors and the like where materials of different electrode potential are joined.

- C. Hangers for piping shall be isolated per Section 230529 when hanger and piping materials are dissimilar and subject to production of electrolysis or galvanic action.

Storage tanks shall be isolated from piping and tank stands by use of anti-electrolytic and galvanic isolators.

3.10 EXISTING PIPES AND MECHANICAL EQUIPMENT TO BE REMOVED

- A. Where existing mechanical equipment, fixtures and/or piping is to be removed and/or relocated, all piping shall be disconnected and capped. All existing piping and hangers not to remain in use shall be removed completely to an existing main that is to remain in use, and capped at the main. General Contractor shall do all cutting, patching, and restoring that may be required for the removal of this piping and equipment. Where it is not possible to remove branch piping not remaining in use, due to its being concealed in the structure, the Division 23 Contractor shall cap the piping concealed at both ends in these areas as approved by the Architect.
- B. All mechanical equipment, fixtures, and piping to be removed and not re-used shall remain the property of the Division 23 Contractor for credit to the contract price except as noted otherwise.

END OF SECTION 23 0529

SECTION 23 0540
MECHANICAL SOUND AND VIBRATION CONTROL

PART 1 - GENERAL

1.1 RELATED WORK

A. Requirements: Provide Mechanical Sound and Vibration Control in accordance with the Contract Documents.

B. Related work specified in other Sections:

Section 230500 - Basic Mechanical Requirements
Section 230529 - Basic Mechanical Materials and Methods
Section 232113 - HVAC Piping & Specialties
Section 233300 - Ductwork and Accessories - Flexible Ductwork Connections

1.2 SYSTEM DESCRIPTION

A. The work includes, but is not limited to the following:

1. Support isolation for motor/driven mechanical equipment.
2. Rails or beams for distribution of equipment loading to isolation units.
3. Fabricated bases for distribution of equipment loading to isolation units.
4. Inertia base frames in conjunction with equipment isolation.
5. Isolation of pipes and ductwork.
6. Sound attenuators.
7. Duct and plenum sound-linings.
8. Sound proofing of construction.
9. External sound proofing.

1.3 QUALITY ASSURANCE

A. The Division 23 Contractor shall be responsible for assuring that all the following sound pressure level criteria are met. Sound pressure level tests shall be carried out by the Section 230593 Contractor in compliance with the Section 230593 specifications.

B. Acoustical Criteria:

1. Noise levels due to equipment and ductwork to permit attaining sound pressure levels in all 8 octave bands in occupied spaces conforming to RC curves:

All occupied spaces ----- RC-35

C. Mechanical Acoustical Performance:

1. Air Distribution system equipment terminal device noise:
 - a. Maximum permissible discharge sound-power levels in octave bands of airborne transmission through the terminal units or related pressure

reducing devices, when operated in installed condition per Drawings and Specifications shall be as per Table 1, following:

TABLE 1 - Maximum PWL (dB re 10E-12 Watt)				
Octave Band	RC-30	RC-35	RC-40	RC-45
1	54	59	64	69
2	68	73	78	83
3	61	66	71	76
4	59	64	69	74
5	51	56	61	66
6	48	53	58	63
7	39	44	49	54

2. Pressure reducing variable air volume boxes radiated noise:

- a. Maximum permissible radiated sound-power levels in octave bands when operated in an installed condition over occupied spaces, shall be as per Table 2 following:

TABLE 2 - Maximum PWL (dB re 10E-12 Watt)				
Octave Band	RC-30	RC-35	RC-40	RC-45
1	54	59	64	69
2	62	67	72	77
3	58	63	68	73
4	55	60	65	70
5	53	58	63	68
6	50	55	60	65
7	46	51	56	61

1.4 SUBMITTALS

- A. Shop Drawings: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract.
- Duct and Plenum Sound Lining.
- B. Test Reports: Submit certified test reports showing compliance in accordance with General Conditions of the Contract of the following items:
- Certification that sound lining meets erosion test method described in UL Publication No. 181.

PART 2 - PRODUCTS

2.1 DUCT AND PLENUM SOUND LININGS

- A. Acceptable Manufacturers: Certain Teed, Johns Manville, Knauf, and Owens Corning.
- B. Product: Fibrous glass, acrylic surface coating, stenciled NFPA, conforming to ASTM C1071 (air velocity), ASTM G21 (fungi resistance) and ASTM G22 (bacteria resistance). Product shall not allow growth of mold or bacteria. This anti-microbial compound shall be tested for efficacy by a nationally recognized testing laboratory (NRTL) and be registered by the EPA for use in HVAC systems.
- C. Minimum thickness: As indicated in Part 3 of this specification.
- D. Sound Absorption Coefficient for 1.5" thickness per the following:

Frequency (cps)	=	125	250	500	1000	2000	4000	NRC
Coefficient	=	0.10	0.47	0.85	1.01	1.02	0.99	0.85
- E. Flamespread Index: Maximum 25.
Smoke Developed Index: Maximum 50.
Tested in accordance with ASTM E84 and UL723. Provide UL labels on product packaging.
- F. Suitable for duct velocity of 5000 fpm. Lining shall meet erosion test method described in UL Publication No. 181.
- G. Dynamic loss coefficient: Maximum 1.2.
- H. Thermal conductivity 0.24 Btu inch/h Ft² °F, tested in accordance with ASTM C518 at 75°F mean temperature.
- I. Provide additional perforated sheet metal facing for protection of acoustical liner at plenum fan discharge plenum in field-built, single wall fan plenums: 26 gauge galvanized steel with perforated 28% minimum open area.

2.2 ADHESIVE AND SEALER

- A. Adhesives and sealers must be compatible with all materials they will be in contact with.
- B. Products comply with NFPA 90A and 90B where used in assemblies exposed to supply, return, or exhaust air.
- C. Surface-Burning Characteristics: Tested in accordance with ASTM E84 with flame-spread index 25 or less, and smoke-developed index of 50 or less, with listing printed on the product package
- D. Service Temperature Range: Exceeds the temperature ranges to which the adhesives and sealers will be exposed and as recommended by the manufacture.
- E. Products comply with the chemical content and VOC requirements of SCAQMD Rule 1168.

2.3 NON-HARDENING CAULKING

- A. Acceptable Products: Tremco "Polybutene", Schuller or accepted equal.

- B. Guaranteed to be permanently elastic.

PART 3 - EXECUTION

3.1 SOUND LININGS

- A. Dimensions of lined ductwork are clear inside dimensions after lining has been installed.
- B. Sound linings to be held in place with mechanical fasteners as per the latest SMACNA duct liner application standard, with joints and any tears to be coated with Benjamin Foster or accepted equal adhesive. The transverse joints to be coated prior to installation so that the ends of the liner are compressed together while the adhesive is still moist, forming a seal of the leading and trailing edge of each joint. Excess adhesive to be brushed to an even finish over the joint.
- C. Provide continuous sheet metal edge protectors at entering and leaving edges of lined duct sections where adjacent to unlined duct sections.

Extent of 1" ductwork sound linings:

1. Upstream of toilet/general exhaust fans and relief air fans, a minimum distance of 20'-0".
2. Transfer air ducts and shaft return stub ducts.
3. Return air elbow boots over ceiling grilles.
4. In return exhaust ducts.

Extent of 1.5" ductwork sound linings:

1. Rectangular ductwork downstream of VAV boxes.
2. In all low pressure rectangular supply ducting.
3. In plenums above supply diffusers.
4. Elsewhere when specifically indicated on drawings.
5. Do not install liner in duct serving evaporative cooled systems 10'-0" downstream of media.

3.2 EXTERNAL VIBRATION DAMPENING

- A. For typical floor supply duct take-offs from main supply riser when required to meet specified sound levels, provide 1/8 inch thick duct exterior coating of vibration dampening compound. These treatments to be provided over the rectangular portion (flat sides) of the floor take-off ducts.

3.3 EXTERNAL SOUND BARRIER INSULATION

- A. Provide foam composite, applied over the vane axial fan casings (both supply and return) extending from the inlet side of the intake sound traps, to the leaving side of the discharge sound traps, inclusive of all flexible connectors.
- B. Provide a duct enclosure of 2 layers of 5/8" gypsum board with staggered seams extending from the point that the ducts leave the rooftop unit or fan plenum to the leaving side of the discharge sound trap(s). A minimum clearance of 1" shall be maintained between the ductwork and the enclosure walls; all voids between the enclosure and the

ductwork to be filled with loose batt fiberglass insulation. The points at which the ductwork penetrates the enclosure; the sheetrock is to be cut away from the ductwork by 1/4" to 1/2" and the void is to be filled with non-hardening caulk. Caulk shall be fire-rated if enclosure is required to be fire-rated.

END OF SECTION 23 0540

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SECTION 230593
TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED WORK

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these Documents.
- B. Related work specified in other Sections:

Section 230500 - Basic Mechanical Requirements
Section 233300 – Ductwork and Accessories

1.2 SYSTEM DESCRIPTION

- A. The work includes, but is not limited to the following:
 - 1. Upon completion of the installation of all the air and heating water systems all necessary adjustments shall be made to provide capacities listed on the Drawings to properly balance these systems.
 - 2. Submittals and written reports as specified.
 - 3. Testing requirements as described in Specification Section 230500, paragraph 1.16.
 - 4. Witness duct leakage test required by Specification Section 233300 – Ductwork and Accessories.

1.3 QUALITY ASSURANCE

- A. Work under this section shall be executed under the direct supervision of a Registered Professional Engineer having an established professional office in the State of Utah and having an experience record of not less than five (5) years in the mechanical contracting industry, engaged in testing, balancing and adjusting of air and hydronic mechanical systems for not less than two (2) years of that time, or, under the direct supervision of a qualified testing, adjusting and balancing supervisor, possessing certification from the National Environmental Balancing Bureau (NEBB) or from the Associated Air Balance Council (AABC).
- B. Comply with the applicable procedures in the chapter on Testing, Adjusting and Balancing in the latest ASHRAE Edition of the NEBB, AABC, and SMACNA Test and Balance documents.
- C. Calibration and maintenance of instruments shall be in accordance with manufacturer's standards and recommendations, and calibration histories for each instrument shall be available for examination.
- D. Accuracy of measurements shall be in accordance with the applicable measurement means as listed in the latest edition of NEBB, AABC, and SMACNA Test and Balance documents.

- E. Allowable Tolerances:
 - 1. Tolerances of adjustment for air handling systems are plus or minus 10% for supply, return, and exhaust systems at air devices and plus 10%/minus 0% at all fans/source equipment from figures shown on drawings.
 - 2. Tolerances of adjustment for hydronic systems, are plus or minus 10% of design conditions shown on drawings at terminal devices and equipment, and plus 10%/minus 0% at all pumps.
- F. Installing Division 23 Contractor will be acceptable to perform the Testing, Adjusting and Balancing work, providing the Quality Assurance requirements can be verified in Contractor submittal of qualifications.
- G. Within 30 days after execution of the Owner-Contractor Agreement, transmit to Architect/Engineer the name and qualifications of the organization proposed to perform the services.

1.4 SUBMITTALS

- A. Procedure: Submit Qualifications, Documentation, Test Schedules and Reports in accordance with the General Conditions of the Contract.
- B. Qualifications:
 - 1. Submit three copies of documentation to confirm compliance with Quality Assurance provisions:
 - a. Organization supervisor and personnel training and qualifications.
 - b. Specimen copy of each of the report forms proposed for use.
- C. Preliminary Report: At least fifteen days prior to starting field work, submit three copies of:
 - 1. A set of report forms filled out as to the design flow values and the installed equipment pressure drops, and the required CFM for air terminals.
 - 2. A complete list of instruments proposed to be used, organized in appropriate categories, with data-sheets for each. Show:
 - a. Manufacturer and model number.
 - b. Description and use when needed to further identify the instrument.
 - c. Size of capacity range.
 - d. Latest calibration date.
 - 3. Architect/Engineer will review submittals for compliance with Contract Documents, and will return one set marked to indicate:
 - a. Discrepancies noted between measured data and Contract Documents.
 - b. Additional, or more accurate, instruments required.
 - c. Requests for re-calibration of specific instruments.
- D. Schedules:

1. Schedule tests to comply with project completion schedules.
 2. Schedule testing and balancing of parts of the systems which are delayed due to seasonal, climatic, occupancy, or other conditions beyond control of the Contractor, as early as the proper conditions will allow, after consultation with Architect/Engineer.
 3. Submit reports of delayed testing promptly after execution of those services.
- E. Final Report: At least fifteen days prior to Contractor's request for final inspection, submit three copies of final reports, on applicable reporting forms, for review. Submit a fourth copy directly to the Engineer. Each individual final reporting form must bear the signature of the person who recorded data and that of the NEBB or AABC certified supervisor of the reporting organization. Identify instruments of all types which were used and last date of calibration of each. Report shall include:
1. A detailed letter to Engineer outlining all abnormal or notable conditions not covered in above data specifically identifying all locations where specified flow tolerances could not be met.
 2. A set of reduced black and white or blueline prints with all air openings clearly marked to correspond with data sheets and with thermometer locations clearly marked.
 3. Data sheets showing amount of air handled at each opening, instrument used, velocity readings, and manufacturer free area factor.
 4. Data sheets giving log of room temperatures in rooms exhibiting objectionable temperatures during the heating season. Logs shall be taken when outside temperature is 30 deg.F or colder.
 5. Data sheets giving log of room temperatures in rooms exhibiting objectionable temperatures during the cooling season. Logs shall be taken with full occupant load, full lighting, and maximum solar conditions.
 6. Heating equipment operating data including air temperatures entering and leaving heating coils (maximum air temperature rise), together with corresponding air flow and air pressure drop, water temperature entering and leaving heating coil, water flow and pressure drop through heating coil.
 7. Sound pressure levels showing readings in all 8 octave bands and plotted on RC(II) charts shall be submitted for the following:
 - a. All spaces exhibiting abnormally high or annoying noise levels.

1.5 PROJECT CONDITIONS

- A. The following job conditions must be verified before any testing, adjusting or balancing of the environmental systems begin:
1. Installation of the designated system is complete and in full operation.
 2. On hydronic systems, strainers shall be cleaned, temperature control valve operation shall be checked, pump rotation shall be checked, pressure reducing valves shall be adjusted, and other such conditions requiring correction.
 3. Air systems shall be checked for dirty filters, filter leakage, equipment vibrations, damper operation, fan rotation, and other such conditions requiring correction.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROCEDURE

- A. Confirm that project conditions have been verified and that necessary corrections have been made before proceeding with the Work.
- B. The Test and Balance Contractor must proportion air/water flows in the system while introducing a minimum amount of resistance. All systems are to be proportionally balanced.
- C. Hydronic Systems:
 - 1. Using system flow meters and/or contact pyrometer, the balancing firm shall adjust the quantity of water or glycol solution supplied to each coil to meet design requirements and mark each balancing cock at final setting.
- D. Air Systems:
 - 1. The balancing firm shall adjust all diffusers and dampers for the delivery and distribution of air quantities shown in the Contract Documents and shall mark each balancing device at final setting.
 - 2. Distribution system shall be adjusted to obtain uniform space temperatures free from objectionable drafts and noise.
 - 3. Set all VAV boxes at minimum/maximum air flow shown on drawings.
 - 4. Adjust air flow switches for proper operation on all fan powered VAV boxes.
 - 5. Test Run: In order to determine that the system installation is complete and will operate satisfactorily, make a test run with equipment operating per normal temperature control schedule and sequence for a period of seven days for each heating and cooling season. Contractor shall notify Architect in writing when he is ready to begin test. Provide personnel to run test and operate and adjust equipment as may be required during test run. Keep a log for each day indicating all malfunctions that occurred and corrections and adjustments made. Be responsible for operation of equipment during this test.
 - 6. Report: After all adjustments are made, a detailed report shall be prepared by the balancing firm and submitted to the Architect for approval. Owner reserves the right to spot check the report prior to final acceptance.

END OF SECTION 23 0593

SECTION 23 0700 MECHANICAL INSULATION

PART 1 - GENERAL

1.1 RELATED WORK

- A. Requirements: Provide insulation in accordance with the Contract Documents.
- B. Related work specified in other Sections:

Section 224450 -Plumbing Equipment
Section 230500 -Basic Mechanical Requirements
Section 230529 -Basic Mechanical Materials and Methods
Section 230540 -Mechanical Sound and Vibration Control
Section 232113 - HVAC Piping & Specialties
Section 233300 - Ductwork and Accessories
Section 235200 -Boilers
Section 235700 -Heat Transfer
Section 236400 -Refrigeration

1.2 SYSTEM DESCRIPTION

- A. The mechanical insulation work required by this Section shall include materials and methods as described herein and on the Drawings and as required by applicable energy codes.
- B. The work includes, but is not limited to providing insulation on the following:
 - 1. Heating Systems:
Heating Water Supply and Return
 - 2. Air Distribution Systems:
Medium Pressure Supply Air
Low Pressure Supply Air
Return Air
Rigid Round Runouts to Diffusers

1.3 QUALITY ASSURANCE

- A. Qualifications: The firm executing the work of this Section shall have at least 3 years successful installation experience on projects with mechanical insulations similar in scope and nature to that required for this Project.
- B. Requirements of Regulatory Agencies: All insulation shall be in accordance with Jurisdictional Building Code and State and Federal Energy Conservation Standards.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications and installation instructions for each type of mechanical insulation in accordance with the General Conditions of the Contract. Include schedule showing manufacturer's product number, thickness and furnished accessories for each mechanical system requiring insulation.
- B. Provide schedule of pipe sizes with insulation thickness at corresponding fluid temperatures.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Delivery of Materials: Deliver insulation, coverings, adhesives, and coatings to site in containers with manufacturer's stamp or label affixed showing fire hazard ratings of products.
- B. Storage of Materials: Protect insulation against dirt, water, chemical and mechanical damage. Do not install damaged insulation; remove from project site.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Acceptable manufacturers of insulation materials shall be as follows:

3M/Thermal Ceramics (FireMaster)
Armstrong
Certain-teed
Dow Chemical
Gilsulate International, Inc. (Gilsulate 500XR Loose-Fill Insulation)
Johns Manville
Knauf
Manson Insulation Products
Owens-Corning
Renler (Pyroscat FastR Wrap)
SpecSeal (Claymac)
Unifrax (Fyrewrap)

2.2 MATERIALS

- A. Conductivity:

TYPE OF INSULATION	MAXIMUM THERMAL CONDUCTIVITY/INCH
Calcium Silicate	0.47 at 600 degrees Fahrenheit
Glass Fiber Pipe Insulation	0.25 at 75 degrees Fahrenheit
Glass Fiber Rigid Equipment Insulation	0.25 at 75 degrees Fahrenheit
Glass Fiber Rigid Duct Insulation	0.24 at 75 degrees Fahrenheit
Glass Fiber Blanket Duct Insulation	0.29 at 75 degrees Fahrenheit
Expanded Polystyrene	0.24 at 75 degrees Fahrenheit
Ceramic Fiber Grease Duct Wrap	0.25 at 70 degrees Fahrenheit
Polyisocyanurate Foam	0.19 at 75 degrees Fahrenheit
Granular Loose Fill	See below

- B. Duct Board: Rigid glass fiber board with a minimum density of 1-1/2 pounds per cubic foot, a maximum thermal conductivity of 0.24 at 75 deg.F and complying with National Fire Protection Association Pamphlet 90A.
- C. Duct Wrap: Blanket-type fiberglass insulation 1-1/2" thick, 0.75 pounds per cubic foot density.
- D. Vapor Barrier Coatings: To have a perm rating not more than 0.25 when tested in accordance with ASTM E96, procedure A.
- E. Adhesives, Sealers, Facings and Vapor Barrier Coatings: To be compatible with materials to which applied, and shall not corrode, soften, or otherwise attack the pipe or insulation materials in either the wet or dry state. Use only adhesives, sealers, facings, and vapor barrier coatings as recommended by the manufacturer of insulation materials.
- F. Chemicals for Treating Paper: Non-soluble.
- G. Non-Collapsing Inserts: Calcium Silicate or Polyisocyanurate. No Polystyrene inserts are allowed.
- H. Granular, Loose-Fill Insulation: Inorganic, nontoxic, nonflammable, sodium potassium aluminum silicate with calcium carbonate filler. Include chemical treatment that renders insulation hydrophobic.
 - 1. Thermal Conductivity (k-Value): 0.60 at 175 deg F and 0.65 at 300 deg F.
 - 2. Application Temperature Range: 35 to 800 deg F.
 - 3. Dry Density: 40 to 42 lb/cu. ft.
 - 4. Strength: 12,000 lb/sq. ft.

2.3 PERFORMANCE CRITERIA

- A. Insulation and accessory materials to meet the following criteria:
 - 1. Insulation Materials: To be noncombustible as defined in National Fire Protection Association Pamphlet 220 and to be Underwriter's Laboratory listed.

2. Flame/Smoke Ratings: Provide composite mechanical insulation (insulation, jackets, coverings, sealers, mastics and adhesives) with flame-spread rating of 25 or less, and smoke-developed rating of 50 or less, as tested by ANSI/ASTM E 84 (NFPA 255) method.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Testing of piping and ductwork to be completed prior to application of insulation.
- B. Apply insulation tightly over clean, dry surfaces with sections or edges firmly butted together.
- C. Make insulation continuous through duct or pipe supports, sleeves, and openings in walls and floors.
- D. Run sealed vapor barriers continuous throughout all cold surface insulation systems.
- E. Avoid the use of staples on vapor barrier jackets. Seal all vapor barrier penetrations with white vapor barrier sealant.
- F. Apply adhesives so as not to exceed the coverages recommended by the manufacturers.
- G. Leave surfaces clean and ready for painting.
- H. Do not insulate cleanouts, access openings or identification plates. Neatly bevel insulation and finishes up to the edges of such openings and stop with sheet metal rings.
- I. Provide non-collapsing inserts between pipe and all shields/saddles on all insulated piping.

3.2 SPECIFIC INSTALLATION REQUIREMENTS

- A. Minimum Pipe Insulation Schedule:

PIPE INSULATION THICKNESS IN INCHES*			
	Nominal Pipe Diameter		
Fluid	< 1.5"	≥ 1.5"	≥ 8"
Heating Water	1.5	2.0	2.0

*Based on insulation having a conductivity not exceeding 0.27 BTU per inch/h·ft²·°F.

Exceptions:

1. Factory installed piping within HVAC equipment tested and rated in accordance with IECC referenced procedures.
2. Strainers, control valves, and balancing valves associated with piping 1-inch or less in diameter on heating water, domestic hot water, domestic tempered hot water, and domestic hot water circulating systems.

B. Minimum Duct Insulation Schedule:

DUCT AND PLENUM INSULATION	
Location	Min. Insulation Value
In unconditioned spaces (i.e. ceiling spaces or unheated spaces)	R-6
Outside building envelope	R-12

Exceptions:

- a. When located within equipment.

C. Heating System:

1. Heating Water Supply and Return:

- a. Fiberglass pipe covering with all-service jacket and self-seal lap.
- b. Thicknesses per Minimum Pipe Insulation Schedule in Section 230700-3.2, A.
- c. Heat exchangers, convertors, air separators, storage tanks and receivers:

351 deg. and up 4" thick
251 deg. - 350 deg..... 3" thick
up to 250 deg..... 2" thick

Fiberglass pipe covering or Du-All pipe and tank wrap with all service jacket. Finish with six-ounce canvas or fiberglass reinforcing mesh applied with heavy coat of lagging adhesive where subject to abuse.

2. Fittings:

- a. Premolded PVC fitting covers with Fiberglass insert.

3. Valves:

- a. All systems: Oversized pipe covering of same material and thickness as adjacent pipe covering. Finish with six-ounce canvas or fiberglass reinforcing mesh and heavy coat of vapor barrier mastic coating.

D. Air Distribution System:

1. Concealed supply ductwork not lined:

Two inch thick 0.75 pound fiberglass duct wrap with foil scrim facings. All joints sealed. Apply material with adhesive or wire 18 inches o.c.

2. Low pressure round runouts to diffusers:

Two inch thick 0.75 pound fiberglass duct wrap with foil scrim facings. All joints sealed. Apply material with adhesive or wire 18 inches o.c.

3. See Specification Section 230540 – Mechanical Sound and Vibration Control for requirements for lined ductwork.

END OF SECTION 23 0700

**SECTION 23 2113
HVAC PIPING AND SPECIALTIES**

PART 1 - GENERAL

1.1 RELATED WORK

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.
- B. Related work specified in other Sections:
 - Section 230500 - Basic Mechanical Requirements
 - Section 230529 - Basic Mechanical Materials and Methods
 - Section 230540 - Mechanical Sound and Vibration Control
 - Section 230593 - Testing, Adjusting and Balancing
 - Section 230700 - Mechanical Insulation
 - Section 233300 - Ductwork and Accessories

1.2 SYSTEM DESCRIPTION

- A. The work includes, but is not limited to the following:
 - 1. Two-way automatic control valves.
 - 2. Hot water heating piping system and specialties.
 - 3. Strainers
 - 4. Valves in accordance with Section 230529.
 - 5. Pipe hangers and supports, saddles and shield in accordance with Section 230529.
 - 6. Mechanical sound and vibration control in accordance with Section 230540.
 - 7. Installation of automatic control valves.
 - 8. Calibrated Balancing Valves.
 - 9. Tests.

1.3 QUALITY ASSURANCE

- A. Welder Qualifications: Welding shall be performed by an NCPWB Certified Welder with current certificate in accordance with ANSI B31.9 for shop and project site welding of piping work.

1.4 REFERENCES

- A. Reference Standards: Except as modified by governing codes and by the Contract Documents, comply with the applicable provisions and recommendations of the following:
 - 1. Comply with American Welding Society (AWS) National Certified Pipe Welding Bureau (NCPWB) and American National Standards Institute (ANSI) Code Numbers B31.2, B31.9 as applicable for welding requirements.

2. Comply with American National Standards Institute (ANSI B31.1) Code for Pressure Piping.
3. ANSI/ASME - Boiler and Pressure Vessel Code.
4. ANSI/ASME B31.9 - Building Services Piping.
5. ANSI/AWS D1.1 - Structural Welding Code.
6. ANSI/ASME Sec. 9 - Welding and Brazing Qualifications.
7. ASTM B32 - Solder Metal.
8. ANSI/AWS A5.8 - Brazing Filler Metal.

1.5 SUBMITTALS

- A. Submit Product Data for the following items under provisions of The General Conditions of the Contract.
 1. Strainers.
 2. Calibrated Balancing Valves.
 3. Thermometers.
 4. Pressure Gauges.
- B. Submit printed Operating Instructions and Maintenance Data for the following items under provisions of Operating and Maintenance Data paragraph in Section 230500.
 1. Strainers.
 2. Calibrated Balancing Valves.
- C. Test Reports: Submit certified test reports for the following showing compliance in accordance with the General Conditions of the Contract:
 1. Piping pressure tests.
 2. Piping systems cleaning and flushing per Section 232500.
 3. Certificates: Before proceeding with the Work, submit to the Architect/Engineer/Construction Manager/General Contractor, two copies of Certification that the welding work will be done according to ANSI B31.1 by welders who have been tested and whose qualification test sheets are available, attesting to their ability to weld in accordance with Standard Procedure Specifications as established by the National Certified Pipe Welding Bureau.

1.6 PROJECT CONDITIONS

- A. Contractor shall not fabricate or install any piping until he has assured himself that the piping can be run as contemplated in cooperation with Contractors of other Divisions of the Work and the physical constraints of the Structural and Architectural Work.

PART 2 - PRODUCTS

2.1 AUTOMATIC CONTROL VALVES

- A. Valves used for fan coil or terminal reheat shall be of the modulating type with a rangeability of at least 50 to 1. Valve body and seat material shall be bronze. The inner valve and stem material shall be stainless steel. The valve shall be of the two-way or three way type.

2.2 HEATING WATER PIPING (LESS THAN 90 PSIG)

- A. Copper Tubing:
1. Tube:
Up to 4" inclusive ASTM B 88, Type L, hard drawn.
 2. Fittings:
 - a. ANSI/ASME B16.23 cast brass and/or
 - b. ANSI/ASME B16.29 solder wrought copper
 3. Joints:
 - a. ASTM B32, solder, Grade 95 TA.

2.3 STATIONARY PRESSURE GAUGES

- A. Acceptable manufacturers: Ametek/U.S. Gauge, Ashcroft, Dwyer Omega, Milijoco, Trerice, Weiss Instruments, Weksler Glass, Weksler Instrument.
- B. Description: Direct-mounted, metal-case, dial-type pressure gauges.
- C. Schedule:

Standard	ASME B40.100	ASME B40.100
Dial Size	4-1/2" Dial	4-1/2" Dial
Bourdon tube/socket	Phosphor bronze tube, brass socket, bottom connection	Stainless steel tube, 316 stainless steel socket, bottom connection
Movement	Mechanical	Mechanical
Accuracy	ASME B40.1 Grade 1A, +/- 1% of span over entire range	ASME B40.1 Grade 1A, +/- 1% of span over entire range
Case	Cast aluminum, or stainless steel	Cast aluminum, or stainless steel
Window	Clear glass	Clear glass
Snubber	Yes	Yes
Coil siphon	For steam service	For steam service
Gauge cock	Yes	Yes

Weatherproof	Where Installed Outdoors	Where Installed Outdoors
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- D. Range: Select gauges for the following standard ranges unless otherwise indicated on drawings, or as required for special systems:

1.	Domestic Water	0 to +160 psi
2.	Low Pressure Steam	-30 in Hg to +60 psi
3.	Steam	-30 in Hg to +150 psi
4.	Compressed Air	0 to +160 psi
5.	Vacuum	-30 in Hg to +15 psi
6.	Pump Gauges	-30 in Hg to +100 psi

2.4 STATIONARY THERMOMETERS

- A. Acceptable manufacturers: Ametek/U.S. Gauge, Dwyer Omega, Milioco, Trerice, Weiss Instruments, Weksler Glass, Weksler Instrument.

- B. Description: Liquid-in-glass, metal case thermometer.

- C. Schedule:

Standard	ASME B40.200
Type	Adjustable angle
Case	9" cast aluminum
Window	Clear acrylic
Tube	Lens front, magnifying
Stem	Aluminum, or brass. insertable
Separable Thermowell	ASME B40.200, part B40.9, Brass
Connection to Thermowell	ASME B1.1 screw threads
Fill Type	Spirit: Blue or red colored, organic
Accuracy	+/- 1% of Full Scale

- D. Range: Select thermometers, for the following standard ranges unless otherwise indicated on Drawings, or as required for special systems.

1.	Chilled water	0 to 100 °F
2.	Condenser water	0 to 100 °F
3.	Heating water	30 to 240 °F
4.	Reclaim water	0 to 100 °F
5.	Steam	50 to 400 °F
6.	Low pressure steam	30 to 300 °F
7.	Steam condensate	30 to 240 °F
8.	Cold brine	-40 to 110 °F
9.	Domestic cold water	0 to 100 °F
10.	Domestic hot water	30 to 240 °F

- E. Thermowells: Pressure-tight, socket-type fitting made for insertion in pipe.

1. Standard: ASME B40.200.
2. Material: Select in accordance with ASME B40.200;
 - a. For use in steel pipe: Brass, bronze, cupro-nickel, corrosion resistant steel, steel.
 - b. For use in copper tube; Brass, bronze, cupro-nickel.
 - c. For use in stainless steel pipe: Stainless steel.
3. Threads: External threads are NPS, internal threads are ASME B1.1 screw threads.
4. Lagging Extensions: Provide lagging extensions on thermowells installed in insulated pipe and tube.

2.5 TEMPERATURE AND PRESSURE TEST PLUGS (T&PTP)

- A. Manufacturer: Fairfax, Flow Design, Peterson Equipment (Pete's Plug), Sisco, Tetric.
- B. Description: Test-station fitting installed in pipe for temporary insertion of pressure gauge or thermometer to determine the pressure or temperature of pipe contents.
- C. Body: Brass for copper tube and steel pipe, type 316 stainless steel for stainless pipe, threaded cap with o-ring gasket and cap retaining strap. Construct body with exterior NPS threads complying with ASME B1.20.1. Extended body plugs are used in insulated pipe, length as necessary so the threaded cap clears the outside surface of the insulation.
- D. Core Insert: EPDM self-sealing, allows temporary insertion of pressure gauge or thermometer without leakage of pipe contents. Rating: Vacuum to 500 psig at temperatures from -20°F to 300°F.

2.6 STRAINERS

- A. Acceptable Manufacturers: Armstrong, Boylston, AW Cash, ITT, Hoffman, Keckley, Mueller, Trane, Metraflex, Victaulic, Gustin-Bacon, Conbraco, Spirax Sarco, Gruvlok, IFC, Nexus.
- B. Size 2 inch and Under: Screwed brass or iron body for 175 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
- C. Size 2-1/2 inch to 4 inch: Flanged or grooved iron body for 175 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.
- D. Size 5 inch and Larger: Flanged or grooved iron body for 175 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen.
- E. Do not install duplicate system strainers in series with strainers that are factory installed on chillers. If shown on drawings, verify with Engineer prior to pipe installation to determine if additional strainer is required.

2.7 AIR VENTS

- A. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/4 inch copper tubing to a petcock.

2.8 PRESSURE COMPENSATING FLOW CONTROL VALVES

- A. Acceptable Manufacturer: Griswold Corporation, Febco, Bell & Gossett, Armstrong, Gerand, Spirax Sarco, Nexus
- B. Provide automatic pressure compensating flow control valves. The F.C.V. and housing shall be in a factory-assembled unit consisting of a flow controller with bronze union fittings with EPDM "O" -ring seals, pressure and/or temperature plugs and ball valve. Flow control valves shall have the flow rates and pressure differential as indicated and strictly conform without exception to the following:
 - 1. The control mechanism of the F.C.V. shall be a coiled/helical spring 17-7 PH. Wave springs are not acceptable. The cartridge for the coiled/helical spring shall be stainless steel. Plated materials are not acceptable. Cartridge must be removable in one piece.
 - 2. Flow control valves must be available in four pressure differential operating ranges:
 - 1 to 14 PSI Drop
 - 2 to 32 PSI Drop
 - 3 to 57 PSI Drop
 - 4 to 128 PSI Drop
 - 3. They shall be factory calibrated and automatically limit the rate of flow to the design flow rate indicated on the Drawings within + or - 5 percent accuracy over an operating pressure differential of at least 14 times the minimum required for control.
 - 4. F.C.V. with an operating pressure differential of one range from 3 to 40 PSI Drop are not acceptable.
 - 5. F.C.V. manufacturer shall warranty to the owner the F.C.V. for a period of two years from date of purchase.
 - 6. All flow control valves shall have two union fittings to provide easy access and removal of the flow control from either the supply or return pipeline.
 - 7. Each automatic flow control valve shall be furnished with a valve kit consisting of 1/4 inch by 2 inch minimum size nipples, quick-disconnect valves (to be located outside of insulation), and fittings suitable for use with the measuring instruments specified.
 - 8. Provide a metal identification tag, with wire, for each flow control valve. The tag to be marked with zone identification, valve model number and rated flow in GPM.
 - 9. All automatic flow controls shall be factory marked to show the direction of flow.
 - 10. A flow pressure and temperature measuring kit shall be furnished to the owner upon completion of the job.
 - 11. The pressure/temperature kit shall be portable and consist of pressure gauges, thermometer, connections and a carrying case.
 - 12. Correct flow shall be verified by establishing that the operating pressure differential across the valve tapings is within the operating range indicated on the submittal data sheet for that model number.
 - 13. Temperature measurement is to be determined by insertion of a thermometer into the fluid media via the temperature plug.

2.9 CALIBRATED BALANCING VALVES

- A. Acceptable Manufacturer: Armstrong, Bell & Gossett, Danfoss, Flow Design, Gerand, Grinnell, Griswold, Gruvlok, Nexus, Nibco, Red-White, Taco, Tour & Andersson, Victaulic.

- B. Bronze, Calibrated-Orifice, Balancing Valve: Bronze body with calibrated orifice or venturi. Throttling ball to be stainless steel or brass, plug to be resin, seats to be PTFE. End connections threaded or socket. Include two pressure gauge connections to include integral seals or check valves to prevent fluid loss when used with a portable differential pressure meter. Include throttling handle with memory stop and position indicator with indexed scale. Valve CWP rating: Minimum 150 PSIG, maximum operating temperature shall not be less than 250°F.
- C. Cast Iron or Steel, Calibrated-Orifice, Balancing Valve: Cast iron or steel body, ball, plug, or globe pattern with calibrated orifice or venture. Stem seals to be EFDM o-rings, disc to be glass and carbon-filled PTFE, seats to be PTFE. End connections to be flanged or grooved. Include two pressure gauge connection ports with integral seals or check valves to prevent fluid loss when used with a portable differential pressure meter valve handle with memory stop and position indicator with indexed scale. Valve CWP Rating: Minimum 150 PSIG, maximum operating temperature shall not be less than 250°F.
- D. Provide a metal identification tag attached to each flow control valve. The tag to be marked with zone identification, valve model number, and rated flow in GPM.
- E. Correct flow shall be verified by establishing that the operating pressure differential across the valve tappings is within the operating range indicated on the submittal data sheet for that model number.

PART 3 - EXECUTION

3.1 PIPE WORKMANSHIP

- A. Piping shown on the drawings shall be installed complete, and shall be of the size shown on the drawings. When a size is not indicated, the sub-contractor shall request the pipe size from the Architect/Engineer thru the General Contractor. All piping shall be installed parallel or perpendicular to the building construction. All piping shall be installed so as to allow for expansion. Install saddles and shields per Section 230529.
- B. Relief Valve: Install a 1" safety relief valve, set at a pressure no more than 5 psig less than the relief valve on boiler or chiller evaporator barrel, to protect against damage by expanding liquid or other source of overpressure during test or normal operation. Discharge of this system relief valve shall be piped to the glycol fill tank for recovery of glycol should relief valve be discharged.

3.2 PIPE SLOPE

- A. Slope all domestic water, chilled water, heating water and condenser water piping at 1"/40' toward drains.

3.3 PIPING JOINTS

- A. All pipe shall be reamed to full pipe diameter before joining. Screwed joints shall be made with standard pipe thread, and an approved compound applied to the male thread only. Welded joints shall be made in accord with the procedure outlined in National Certified Pipe Welding Bureau, or by other reputable testing laboratory or agency.

Subcontractor shall use only "Threadolet" or "Weldolet" fittings for intersection welding of branches to mains. Valves and specialties shall have screwed or flanged joints. No bushings allowed.

- B. All pipe shall be reamed to full pipe diameter before joining.
- C. Pull tee (T-drill) fittings are forbidden.

3.4 SYSTEM PRESSURE SETTINGS

- A. Hot Water Heating System: Fill system to 10 psig at highest point in system. Set system pressure monitoring system to generate a low system pressure alarm when system pressure is 5 psi below fill pressure. Pre-charge bladder-type expansion tank to 2 psig less than "fill" pressure prior to connection to the system.

3.5 RELIEF VALVES

- A. Provide a pressure relief valve in each closed loop system set at 1.2 times the maximum operating pressure.

3.6 CHANGE IN PIPE SIZE

- A. Where changes in the pipe size are required at equipment connections, change the pipe size within a maximum length of three pipe size diameters of the final connection.
- B. Where changes in pipe size occur in horizontal straight lengths of pipe, install concentric reducers.

3.7 AIR VENTS

- A. At all changes in elevation downward in direction of flow, and where shown, provide a manual air vent as follows: install a full size air chamber and pipe down with 1/4 inch copper tubing to a petcock. If the vent is above a ceiling, install the petcock just above the ceiling. Provide air vent fittings (manual) on hydronic coils.

3.8 CALIBRATED BALANCING VALVES

- A. Provide a calibrated balancing valve in the supply pipe to each piece of equipment and where shown on the drawings.
- B. Select calibrated balancing valves to match equipment or circuit flow rates shown on drawings. Provide pipe size reducers as necessary.
- C. Install in accordance with all manufacturer's recommendations, including minimum pipe diameters of straight pipe upstream and downstream of the balancing valve.

3.9 PIPING CONNECTORS

- A. Install flexible pipe connectors at equipment coils and pumps and elsewhere as required to accommodate thermal expansion, misalignment and vibration in accordance with Section 230540 - Mechanical Sound and Vibration Control.

3.10 STRAINERS

- A. Provide a strainer in the supply pipe upstream of each control valve, chiller, heat exchanger, where required by equipment manufacturers, and where shown on the drawings and details.
- B. Remove and clean all strainer screens after 24 hours of system operation, and again after 30 days.

3.11 THERMOMETERS AND PRESSURE GAUGES INSTALLATION

- A. Install thermowells with socket extending into pipe 1/3 of nominal pipe diameter and in vertical position on top of pipe. Include extension where thermowell is installed in insulated piping.
- B. When recommended by the manufacturer, fill thermowells with manufacturer's recommended heat-transfer medium before inserting thermometers.
- C. Provide a gauge cock on the branch line to each pressure gauge. Provide a snubber in piping for each pressure gauge in hydronic systems.
- D. Install thermometers and pressure gauges at readily accessible locations where easily read in a standing position from the equipment room floor.
- E. Provide four thermometers in piping the following locations:
 - 1. Condenser water lines entering and leaving chillers.
 - 2. Chilled water lines entering and leaving chillers.
 - 3. Heating water lines entering and leaving boilers.
 - 4. All supply and return piping at heat exchangers.
 - 5. All supply and return piping at heat pumps.
 - 6. Where indicated on drawings, details and schematics.
- F. Provide pressure gauges in piping at the following locations:
 - 1. All supply and return piping at heat exchangers.
 - 2. All supply and return piping at chillers.
 - 3. Where indicated on drawings, details, and schematics.

3.12 TEMPERATURE AND PRESSURE TEST PLUGS

- A. Provide extended body test plugs in insulated pipe, body length as necessary so threaded cap protrudes through the exterior surface of the pipe insulation.
- B. Close threaded caps finger-tight on all test ports.
- C. Verify cap retaining straps are present on all test ports. Replace any broken retaining straps.

3.13 TESTS

- A. General: Provide test pump, gauges, meters, other instruments, materials, and labor, in connection with tests.
- B. Relief Valve: Install a 1" safety relief valve, set at a pressure no more than 5 psig less than the relief valve on boiler or chiller evaporator barrel, to protect against damage by expanding liquid or other source of overpressure during test or normal operation. Discharge of this system relief valve shall be piped to the glycol fill tank for recovery of glycol should relief valve be discharged.
- C. Pressure Tests: Before testing piping systems, remove or otherwise protect from damage, control devices, air vents and other parts which are not designed to stand pressure used in testing piping.
- D. Hydrostatic Pressure: Test hydronically, piping for all services (except pneumatic system compressed air) to 125 psi or 1.5 times the maximum working pressure, whichever is greater, for at least six consecutive hours, during which time pressure shall remain constant without pumping. Subject welded joints to the hammer test, and copper joints to soap suds while under hydrostatic pressure.

3.14 CLEANING OF PIPING SYSTEMS

- A. Provide for the cleaning of the HVAC Water Piping Systems after hydrostatic tests have been completed and prior to the operating tests in accordance with Section 232500 - HVAC Water Treatment.
- A. On projects where new piping connects to existing piping systems, provide bypasses, isolation valves, and temporary pumps as necessary to allow circulation of cleaning solution in new piping without allowing system cleaning solution to circulate through existing piping system. Contractor is responsible for removing and cleaning strainers in new or existing system plugged by cleaning of new system. Simply blowing down strainers is not acceptable.

END OF SECTION 23 2113

SECTION 23 2500 HVAC WATER TREATMENT

PART 1 - GENERAL

1.1 WORK INCLUDED

- A. Pre-Startup cleaning of HVAC Piping Systems.
- B. Treatment for Closed Systems:
 - 1. Heating Water

1.2 RELATED WORK

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.
- B. Section 230500 - Basic Mechanical Requirements.
- C. Section 230529 - Basic Mechanical Materials and Methods.
- D. Section 232113 - HVAC Piping and Specialties.

1.3 QUALITY ASSURANCE

- A. Coordinate with owner to use existing facility water treatment contractor.

1.4 SUBMITTALS

- A. Technical Data: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract:
 - 1. Water Treatment Materials and Equipment.
 - 2. Chemicals and quantity provided.
- B. Operating Instructions and Maintenance Data: Submit printed Operating Instructions and Maintenance Data for the following items in accordance with Operating and Maintenance Data Paragraph in Section 230500.
 - 1. System start-up report.

PART 2 - PRODUCTS

2.1 PRE-STARTUP CLEANER

- A. Provide a pre-startup liquid alkaline dispersant cleaner for the flushing and cleaning of all new heating water piping to remove oil and foreign matter from the piping and equipment prior to the final filling of the systems. This chemical shall not be injurious to persons, piping, pipe joint compounds, packings, coils, valves, pumps, and their mechanical seals, tubes or other parts of the system.
- B. Furnish complete instructions dictating the quantities of the cleaner to use, methods, and duration of the operation.

PART 3 - EXECUTION

3.1 CLEANING OF PIPING SYSTEMS

- A. Thoroughly clean the new heating water piping systems after hydrostatic tests have been completed and prior to the operating tests with liquid alkaline dispersant cleaner per instructions specified in Part 2 dictating the quantities of the cleaner to use, methods, and duration of the operation. Systems shall then be drained and thoroughly flushed out with fresh water.
- B. Contractor shall notify Architect/Engineer prior to cleaning operation and shall verify in writing to the Architect/Engineer after the system has been cleaned.
- C. Failure of any part of the system due to improper cleaning or inadequate chemical feed shall be the responsibility of the Division 23 Contractor.
- D. Contractor is to provide bypasses and isolation valves as required to allow circulation of cleaning solution in new piping system without allowing system cleaning solution to circulate through existing piping system. Coordinate proper bypass and isolation valve locations with all trades to ensure proper cleaning of entire new HVAC piping systems.

END OF SECTION 23 2500

**SECTION 23 3300
DUCTWORK AND ACCESSORIES**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Low pressure ductwork.
- B. Medium pressure ductwork.
- C. Manufactured duct joints.
- D. Damper operator hardware.
- E. Volume control dampers.
- F. Insulated flexible round ductwork.

1.2 RELATED REQUIREMENTS

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.
- B. Section 230500 - Basic Mechanical Requirements.

1.3 RELATED SECTIONS

- A. Section 230529 - Basic Mechanical Material and Methods.
- B. Section 230540 - Mechanical, Sound and Vibration Control.
- C. Section 230593 - Testing, Adjusting and Balancing.
- D. Section 230700 - Mechanical Insulation.

1.4 REFERENCES AND CODE REQUIREMENTS

- A. AISC Steel Construction Manual
- B. AISI Cold Formed Steel Design Manual
- C. ASHRAE - Handbook Fundamentals; Duct Design Chapter.
- D. ASHRAE - Handbook HVAC Systems and Equipment; Duct Construction Chapter.
- E. ASTM A90 - Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles.

- F. ASTM A480 – Standard Specification for General Requirements for flat-rolled stainless and heat-resisting steel plate, sheet, and strip.
- G. ASTM A653 – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dipped Process.
- H. ASTM B209 - Aluminum and Aluminum Alloy Sheet and Plate.
- I. ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.
- J. ASTM C443 - Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
- K. NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- L. NFPA 90B - Installation of Warm Air Heating and Air Conditioning Systems.
NFPA 92A - Smoke Control Systems.
NFPA 92B - Smoke Management Systems.
- M. NFPA 96 - Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment.
- N. SCAQMD Rule 1168 – Adhesive and Sealant Applications
- O. SMACNA - HVAC Duct Construction Standards.
- P. SMACNA - HVAC Air Duct Leakage Test Manual
- Q. SMACNA - Fibrous Glass Duct Construction Standards.
- R. UL 33 - Heat Responsive Links for Fire-Protection Service.
- S. UL 181 - Factory-Made Air Ducts and Connectors.
- T. UL 555 - Fire Dampers and Ceiling Dampers.
UL 555S - Leakage Rated Dampers for Smoke Control Systems.

1.5 DEFINITIONS

- A. Duct Sizes: Inside clear dimensions. For lined ducts, maintain sizes inside lining.
- B. Low Pressure: Design and Construct to SMACNA 2 in. w.g. pressure class. Low pressure duct shall include: Supply duct downstream of VAV boxes, return duct, general/toilet exhaust ducts, fresh air duct, relief duct, smoke exhaust duct and combustion air duct, unless otherwise indicated on drawings.
- C. Medium Pressure: Design and Construct to SMACNA 6 in. w.g. pressure class. Medium pressure duct shall include: Supply duct from supply fan(s) to VAV box inlets including built-up plenums where applicable.

1.6 REGULATORY REQUIREMENTS

- A. Construct ductwork to NFPA 90A and NFPA 90B standards.

1.7 SUBMITTALS

- A. Submit Shop Drawings for the following items under provision of The General Conditions of the Contract:
 - 1. Duct fittings, particulars such as gauges, sizes, weld, and configuration prior to start of work for low pressure and medium pressure duct systems.

1.8 PROJECT CONDITIONS

- A. Do not fabricate or install any ductwork until Contractor has confirmed that the ductwork can be run as contemplated in cooperation with Contractors of other Divisions of the Work and the physical constraints of the Structural and Architectural Work.
- B. Provide any and all off-sets and fittings required to coordinate with field conditions. The lack of coordination will not constitute a change in contract price. The contract drawings are of a schematic nature only, exact duct routing and field coordination is the responsibility of the Contractor.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Nonmetallic air ducts and connectors shall conform to UL 181 Class 0 or Class 1.
- B. Steel Ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having G90 zinc coating each side in conformance with ASTM A90.
- C. Fasteners: Rivets, bolts, or sheet metal screws.
- D. Sealant: Non-hardening, water resistant, fire resistive, compatible with mating materials; liquid used alone or with tape, or heavy mastic, and comply with the chemical content requirements of SCAQMD Rule 1168.

2.2 LOW PRESSURE DUCTWORK

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures specified or as indicated on drawings.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline. Where not possible and where rectangular elbows are used, provide turning vanes.
- C. Construct fittings with 45 degree wye or 90 degree wye with 45 degree entry.

- D. Round branch connections shall be plain flanged or spin collar fittings of 90 degrees unless indicated otherwise on drawings. Round branch connections fittings serving low-pressure duct run-outs to diffusers and grilles shall include damper blade with two quadrants, fully retractable zinc alloy bearings, washers, and position handle with wing nut to lock damper position. Where used on externally insulated ducts, provide with single quadrant installed on 2" standoff bracket plate with position handle and wing nut to lock damper position.
 - 1. Provide remote operated damper where round branch duct and fitting is not accessible.
 - a. Manually operated, gear driven cable operated damper with manual HEX head actuator, cable mounting bracket, white cover plate where installed in ceiling, and cable.
 - b. Electronic, with factory installed 9 volt DC motor and low-voltage, plenum rated cable that terminates with standard connector. A hand-held device contains the 9 volt battery and plugs into the standard end-of-cable connector to rotate damper blade to adjust airflow. Cables to terminate in a j-box with the end-of-cable connectors secured in a face plate that accommodates up to twelve end-of-cable and includes labels that identify the balance damper served by each cable. Provide two hand-held devices for the project. Acceptable manufacturers include Greenheck, Pottorff, Price Industries, M.A.P/Metropolitan Air Technology, Ruskin, Young Regulator, Zip Group.
- E. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.
- F. Provide easements where low pressure ductwork conflicts with piping and structure. Where easements exceed 10 percent duct area, split into two ducts maintaining original duct area.
- G. Use crimp joints with or without bead for joining round duct sizes 8 inch and smaller with crimp in direction of airflow.

2.3 MEDIUM PRESSURE DUCTWORK

- A. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and ASHRAE handbooks. Provide duct material, gauges, reinforcing, and sealing for operating pressures specified or as indicated on drawings.
- B. Construct T's, bends, and elbows with radius of not less than 1-1/2 times width of duct on centerline.
- C. Provide conical fittings constructed to conform to details of the Sheet Metal and Air Conditioning Contractors National Association Manual (SMACNA) in branch ducts of medium pressure take-offs to VAV boxes.
- D. Transform duct sizes gradually, not exceeding 15 degrees divergence and 30 degrees convergence

2.4 DUCT SUPPORTS

- A. Hanger Rods:
 - 1. Hanger Rods for Galvanized Steel Duct: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
 - 2. Hanger Rods for Stainless Steel Duct: Stainless steel all-thread rods.
 - 3. Hanger Rods for Aluminum Duct: Aluminum all-thread rods.
- B. Hanger Straps:
 - 1. Hanger Straps for Galvanized Steel Duct: Galvanized steel.
 - 2. Hanger Straps for Stainless Steel Duct: Stainless steel.
 - 3. Hanger Straps for Aluminum Duct: Aluminum.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct." SMACNA's "Rectangular Industrial Duct Construction Standards," or SMACNA's "Round Industrial Duct Construction Standards.
- D. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- E. Trapeze and Riser Supports:
 - 1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 - 2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
 - 3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

2.5 MANUFACTURED DUCT JOINTS

- A. Manufacturer: Ductmate Industries, Inc., TDF, MEZ Industries, Hercules.
- B. Transverse duct joints of medium pressure ductwork shall be made with the Ductmate System components of standard catalog manufacture.

2.6 DAMPER OPERATOR HARDWARE

- A. Manufacturers: Ventfabrics Ventlok Regulators, Metropolitan Air.
- B. Other acceptable manufacturers offering equivalent product: Duro Dyne, Daniel.
- C. Regulators and End Bearings.
 - Damper shaft length:
 - 12" or less - Ventlok #620 Regulator.
 - 12" to 20" - Ventlok #635 Regulator and #607 Bearings.
 - Larger dampers - Ventlok #640 or #641 Regulator and #607 Bearings.
- D. Provide equivalent model elevated bases for insulated ducts.

- E. Provide remote damper control where any damper does not have permanent access. System to include a locking worm drive gear, 1/4" flexible steel shaft and a concealed ceiling cap of 1". Manufacturers: Young Regulator, Price, or approved equal.

2.7 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards, and as indicated.
- B. Fabricate single blade dampers for duct sizes to 9-1/2 x 30 inch.
- C. Fabricate multi-blade damper of opposed blade pattern with maximum blade sizes 6 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized channel frame with suitable hardware.
- D. Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, polymer or sintered bronze bearings.
- E. Provide locking, indicating quadrant regulators on single and multi-blade dampers.
- F. On insulated ducts, mount quadrant regulators on stand-off mounting brackets, bases, or adapters.
- G. Specification for low-pressure spin collar fittings with integral balancing dampers is found in paragraph 2.2.

2.8 INSULATED FLEXIBLE ROUND DUCTWORK

- A. Manufacturer: Flexmaster Type 5B - Insulated.
- B. Other acceptable manufacturers offering equivalent product subject to compliance with specified requirements: Genflex, Thermaflex, Wiremold, Cleva-Flex, H.K. Porter Co., Cal-Flex, Hart & Cooley, Hercules, Quietflex.
- C. Insulated low pressure flexible duct factory fabricated assembly consisting of a polyester coated fiberglass fabric mechanically interlocked by a galvanized steel spiral helix wrapped with minimum R=6 fiberglass insulation sheathed in a vapor barrier jacket. Vapor barrier permeance ≤ 0.10 perm, per ASTM E96.
- D. Composite assembly, including insulation and vapor barrier shall be UL Listed 181 for Class 1 Air Duct Material and comply with NFPA Standard 90A.

PART 3 - EXECUTION

3.1 GENERAL SHEET METAL INSTALLATION

- A. Duct sizes fall within the limiting dimensions indicated on the Drawings. Provide sheet metal duct systems, connections, dampers, duct turns, housings, hinged sheet metal doors and necessary removable access doors for the complete supply, return, and exhaust systems. Install accessories in accordance with manufacturer's instructions.

- B. Wherever exposed ducts pass through walls, floors, or ceilings, a 2-inch flanged sheet-metal collar fitting close around ducts to be slipped along duct until flange is tight against finished surface covering edges of openings and presenting a neat appearance. Lock collar to duct.
- C. Wherever ducts penetrate floors or fire walls, install safining insulation to maintain fire wall integrity.
- D. Cut or drill temporary test holes in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps. Permanent test holes shall be factory fabricated, airtight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.
- E. Provide openings in ductwork where required to accommodate thermometers and controllers.
- F. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
- G. Where Bellmouth fittings are specifically called for on Drawings, provide standard Bellmouth fittings per SMACNA Standards.
- H. On smoke management system ducts, conduct a leakage test, per Chapter 9 of the 2009 IBC, to 1.5 times the design pressure. Total leakage shall not exceed 5% of design flow.
- I. Wherever dampers are concealed under insulation, provide marker ribbon for identification. Hang ribbon below adjacent ductwork to allow view from any angle.
- J. Requirements for duct liner are located in Specification Section 230540 – Mechanical Sound and Vibration Control.

3.2 MEDIUM AND HIGH PRESSURE DUCTWORK (greater than 2" w.c.)

- A. Use radius elbows with centerline radius of 1.5D (or 1.5W for rectangular) for all turns in medium pressure ductwork. Obtain Engineer's approval for reducing the centerline radius at specific locations where a centerline radius of 1.5 cannot be provided because of conflict with building structure or other utilities. Note approval may not be given if other solutions are possible.

3.3 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports", the SMACNA Industrial Duct Construction Standards, the AISI Cold Formed Steel Design Manual, and the AISC Steel Construction Manual referenced in that chapter.
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Where practical, install concrete inserts before placing concrete.

2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Duct Attachments: Do not penetrate laboratory exhaust ducts or hazardous exhaust ducts with screws, rivets, or any fasteners.
- D. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- E. Hangers Exposed to View: Threaded rod and angle or channel supports.
- F. Support vertical ducts with steel angles, channel, tube steel, or I-beams secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet. Size in accordance with the SMACNA Duct Construction Standards, the SMACNA Rectangular Industrial Duct Construction Standards, the AISI Cold Formed Steel Design Manual, and the AISC Steel Construction Manual.
- G. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.4 SEALING OF DUCTWORK

- A. Seal all ductwork to Seal Class A as defined in the SMACNA HVAC Duct Construction Standards and as required by the International Energy Conservation Code. Additional sealing will be required if audible air leaks are observed. Where joints are not accessible for proper sealing, cut hand holes in duct and seal the joints from the inside.

3.5 MANUFACTURED DUCT JOINTS

- A. The installation of the manufactured duct joints shall be in accordance with the manufacturer's printed instruction and installation manuals. Apply multiple thicknesses of folded butyl gasket material at each corner of rectangular duct joints to assure air tightness.

3.6 DUCTWORK APPLICATION SCHEDULE

- A. AIR SYSTEM MATERIAL

Low Pressure Supply	Galvanized Steel
Medium and High Pressure Supply	Galvanized Steel
Low Pressure Flex Duct	Insulated Flexible Round Duct

3.7 DAMPER OPERATOR HARDWARE

- A. Install per manufacturer's instructions and recommendations. Coordinate any ceiling control locations prior to installation.
- B. Coordinate length of flexible shaft on site.

3.8 VOLUME CONTROL DAMPERS

- A. Provide balancing dampers at points on low pressure supply, return, and exhaust systems where branches are taken from larger ducts as required for air balancing.

3.9 INSULATED FLEXIBLE ROUND DUCTWORK

- A. Connect diffusers or troffer boots to low pressure ducts with 6 feet maximum length of flexible duct.
- B. Install flexible ducts in a fully extended condition, free of sags and kinks, using only the minimum length required to make the connection. Bends shall be made with not less than one duct diameter centerline radius. Provide Flexmaster FlexRight radiused supports as necessary.
- C. Where horizontal flex duct sags more than ½ inch per foot, suspend flexible duct on 35-inch centers with a minimum one inch wide flat bending material.
- D. Where "lift-out" ceilings occur, install with volume damper in flex duct at connection to main duct.
- E. Make all connections to metal ducts, diffusers, and troffer boots with draw bands or metal clamps. Use only continuous lengths of flexible duct, no joints are allowed between two lengths of flexible ducts.

END OF SECTION 23 3300

**SECTION 23 3600
AIR TERMINAL UNITS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. VAV Single Duct Terminal Units.

1.2 RELATED REQUIREMENTS

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.
- B. Section 230500 - Basic Mechanical Requirements.

1.3 RELATED SECTIONS

- A. Section 230529 - Basic Mechanical Materials and Methods.
- B. Section 230593 – Testing, Adjusting, and Balancing.

1.4 SUBMITTALS

- A. Submit Product Data for the following items under provision of The General Conditions of the Contract:
 - 1. VAV boxes.
 - 2. Submit product data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings which indicate air flow, static pressure, and NC designation.
 - 3. Include schedules listing discharge and radiated sound power level for each of second through sixth octave bands at inlet static pressures of one to 4 inch wg.
- B. Submit printed Operating Instructions and Maintenance Data for the following items under provisions of Operating and Maintenance Data paragraph in Section 230500.
 - 1. VAV boxes.

PART 2 - PRODUCTS

2.1 VAV LOW PRESSURE ZONE TERMINAL UNITS

- A. Approved manufacturers: Titus Model ESV, Carnes, Krueger, Price, Metal Air, Carrier, Tuttle & Bailey, Anemostat, Enviro-Tec.

- B. Terminal units designated of sizes shown on Drawings or terminal unit schedule. Units shall have factory catalog performance ratings which conform to cfm, static pressure, discharge and radiated sound power and attenuation designated.
- C. Construction:
1. Cabinets constructed of minimum 22 gauge galvanized steel. Casing fabricated to prevent air leakage of no more than 3 cfm at 1-inch w.g. inlet static pressure. Internal surfaces acoustically and thermally insulated with 1" glass fiber material surface treated to prevent erosion and complying with UL 181, NFPA-90, ASTM C 1071, and ASTM E 84. All surfaces in contact with the supply air shall comply with the requirements of the current edition of ASHRAE Standard 62.1.
 2. Air volume damper assemblies made from exactly dimensioned extruded anodized aluminum components. Damper blades shall have extruded ribs which key into grooved shaft for permanent fix of damper. All internal damper pivot points shall include bearings for noiseless operation requiring no lubrication. Damper assemblies constructed to prevent air leakage in excess of 2% of design airflow at 3-inch w.g. inlet static pressure.
- D. Differential Pressure Airflow Sensors: Averaging, multi-point total and static pressure port array with amplified signal and gauge taps. Velocity pressure to be determined by measuring difference between total and static pressure. Accuracy shall not exceed +/- 5% at an air velocity of 2,000 FPM. Developed differential pressure not less than 0.03" w.g. at an air velocity of 450 fee/minute.
- E. Performance Testing and Rating:
1. Performance of units shall be rated in accordance with the current edition of AHRI Standard 880.
- F. Controls:
1. Controls shall match existing building controls system.
- G. Hot Water Coils:
1. Provide, where indicated, terminal units with factory mounted reheat coils, with performance and rows as indicated on schedules. Coils to consist of copper tubes with mechanically bonded aluminum fins and shall be rated for a minimum working pressure of 200 psig.
 2. Coils shall be tested and certified in accordance with AHRI Standard 410.
 3. Coils to be installed so that supply water enters at the bottom and back of coil, rotate coil to accommodate. Improperly installed coils will be reinstalled at Contractor's expense.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Provide ceiling access doors or locate above easily removable ceiling components.
- C. Support units individually from structure. Do not support from adjacent ductwork.
- D. Connect to ductwork in accordance with Section 233300. Allow minimum 2.5 times duct diameter of straight hard duct at terminal inlet.

3.2 ADJUSTING VAV TERMINAL UNITS

- A. Reset volume with damper operator attached to assembly allowing flow range modulation from 100 percent of design flow to 0 percent full flow. Set units with heating coils for minimum flow rates per VAV box schedule.

END OF SECTION 23 3600

**SECTION 23 3713
AIR INLETS AND OUTLETS**

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Diffusers.

1.2 RELATED REQUIREMENTS

- A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this Section, and Contractor shall review and adhere to all requirements of these documents.
- B. Section 230500- Basic Mechanical Requirements.

1.3 RELATED SECTIONS

- A. Section 230529 - Basic Mechanical Materials and Methods: Painting of ductwork visible behind outlets and inlets.
- B. Section 233300 - Ductwork and Accessories.
- C. Section 233600 - Air Terminal Units.
- D. Section 230593 - Testing, Adjusting and Balancing.

1.4 REFERENCES

- A. AMCA 500 - Test Method for Louvers, Dampers and Shutters.
- B. ANSI/NFPA 90A - Installation of Air Conditioning and Ventilating Systems.
- C. ARI 890-91 - Rating of Air Diffusers.
- D. ASHRAE 70 - Methods of Testing for Rating the Air Flow Performance of Outlets and Inlets.
- E. SMACNA - HVAC Duct Construction Standard.
- F. ASTM C 636 – Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

1.5 QUALITY ASSURANCE

- A. Test and rate performance of air outlets and inlets in accordance with ASHRAE 70 and ARI 890.

- B. Test and rate performance of louvers in accordance with AMCA 500.

1.6 REGULATORY REQUIREMENTS

- A. Conform to ANSI/NFPA 90A.

1.7 SUBMITTALS

- A. Submit Product Data for the following items under provision of The General Conditions of the Contract:
 - 1. Diffusers.
- B. Submit schedule of outlets and inlets indicating type, size, location, application, and noise level.
 - 1. Review requirements of outlets and inlets as to size, finish, and type of mounting prior to submitting product data and schedules of outlets and inlets.

PART 2 - PRODUCTS

2.1 CEILING DIFFUSERS (SEE AIR DEVICE SCHEDULE ON PLANS)

- A. Acceptable Manufacturers: Titus, Anemostat, Barber Colman, Krueger, Carnes, Metal-Aire, Nailor-Hart, Tempo, Air Diffusion Products, Tuttle & Bailey, Price, Hart & Cooley.
- B. Ceiling Diffusers located in hard ceilings are configured to be secured with concealed fasteners or to lay in a gyp board frame.
- C. Radial Diffusers have different active face areas that increase as neck size increases.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install items in accordance with manufacturers' instructions.
- B. Install ceiling mounted items in accordance with ASTM C 636.
 - 1. Ceiling mounted air terminals or services weighing less than 20 pounds shall be positively attached to the ceiling suspension main runners or to cross runners with the same carrying capacity as the main runners.
 - 2. Terminals or services weighing 20 pounds but not more than 56 pounds, in addition to the above, shall have two No. 12 gauge hangers connected from the terminal or service to the ceiling system hangers or to the structure above. These wires may be slack.

- 3. Terminals or services weighing more than 56 pounds shall be supported directly from the structure above by approved hangers.
- C. Check location of outlets and inlets and make necessary adjustments in position to conform with architectural features, symmetry, and lighting arrangement.
- D. Provide balancing dampers on duct take-off to diffusers, and grilles and registers, regardless of whether dampers are specified as part of the diffuser, or grille and register assembly.
- E. Paint ductwork visible behind air outlets and inlets matte black.
- F. Install diffusers to ductwork with air tight connection.
- G. Air devices located in hard ceilings are to be secured with concealed fasteners or must be provided with a hard ceiling frame for lay-in installation. Unless noted otherwise in documents, do not secure with visible screws.
- H. Install duct connections to fire rated UL Listed and Labeled diffusers and return grilles in strict accordance with instructions furnished by manufacturer.

END OF SECTION 23 3713

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SECTION 28 3111

FIRE ALARM AND DETECTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Division-26 Basic Materials and Methods sections apply to work specified in this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of fire alarm and detection systems work is indicated by drawings, schedules and as specified herein.
- B. Comply with NEC as applicable to construction and installation of fire alarm and detection system components and accessories. Provide components and systems that are UL-listed and labeled for fire alarm. Provide fire alarm and detection systems and accessories that are FM approved. Comply with State and local requirements as applicable.
- C. Comply with applicable provisions of current NFPA Standards 72, National Fire Alarm Code, local building codes, and meet requirements of local authorities having jurisdiction.

1.3 SUBMITTALS:

- 1. Submit manufacturer's data on fire alarm and detection systems including, but not limited to, roughing-in diagrams and instructions for installation, operating and maintenance, suitable for inclusion in maintenance manuals.
- 2. Provide shop drawings showing equipment/device locations and connecting wiring of entire fire alarm and detection system. Include wiring diagrams and riser diagrams of panel. Provide dimensioned drawing of Fire Alarm Control Panel and Building Graphic. Shop drawings shall be prepared by an individual with a minimum NICET III (Fire Protection Engineering Technology/Fire Alarm Systems) certification. The individual's name and certification number shall be shown on the submittal design drawings.
- 3. Submit a written statement to the Architect and the state and local Fire Marshal's Office that each device of the fire alarm system will be installed, inspected and tested in accordance with applicable requirements of NFPA Standard 72.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS:

- A. MANUFACTURER: Subject to compliance with requirements, provide fire alarm and detection systems of one of the following:
 - 1. Existing Notifier
- B. The job foreman or lead technician shall be factory trained and certified on the system being installed. Individual shall have a minimum NICET II certification.

2.2 FIRE ALARM AND DETECTION SYSTEMS:

- A. GENERAL: Expand existing electrically operated, electrically supervised fire alarm system as described herein. Include control units, power supplies, alarm initiating and indicating devices, conduit, wire, fittings and accessories required to provide a complete operating system. Enclose entire system in raceway. Provide basic wiring materials that comply with Division 26, Basic Materials and Methods Sections for raceways, conductors, boxes, fittings, supports, etc. Minimum wire size to be #14 AWG copper.
- B. SYSTEM TYPE: Analog addressable, non-coded. Either manual activation of a fire alarm station or activation of an automatic initiating device energizes all fire alarm signaling devices, sounding a non-coded alarm and providing device identification on an annunciator panel.
- C. SYSTEM OPERATION: Provide system such that any manual station or automatic initiating device annunciates all alarm indicating units (bells, horns, buzzers, chimes, visual alarm lamps, etc.) continuously until the manual station or initiating device is restored to normal and the fire alarm control unit reset. Annunciate alarm signals by device at the control panel and all remote annunciators. Provide all conductors, raceway, equipment and labor to accomplish the following:

2.3 SCOPE OF THE WORK:

- A. Relocate existing fire alarm devices as noted on drawings.
- B. All wiring shall be in conduit (3/4" minimum). All conduit and connectors, shall be made of steel. All conduit runs shall form a complete loop from the fire alarm control panel.

PART 3 - EXECUTION

3.1 GENERAL REQUIREMENTS:

- A. Approved Plans: A copy of the approved and stamped plans shall be on site during the installation and at the time of inspection to verify that the system is installed according to the approved plans.
- B. Install fire alarm and detection systems as indicated, in accordance with equipment manufacturer's written instructions and complying with applicable portions of NEC and NECA's "standard of installation".
- C. Install wiring, raceways, and electrical boxes and fittings in accordance with Division 26 Basic Materials and Methods section, "Raceways", "Wires and Cables", and "Electrical Boxes and Fittings", and in accordance with other sections, as applicable.
- D. All wire used on the fire alarm system shall be U.L. Listed as fire alarm protective signaling circuit cable per NEC, Article 760.
- E. If twisted or shielded wire is required or recommended by the manufacturer it must be used.
- F. Review proper installation procedure for each type of device with equipment supplier before installation.
- G. Refer to NFPA for spacing and exact placement of fire alarm devices.
- H. Electrical Identification: Refer to Section 260553 for requirements.

PART 4 - FINAL ACCEPTANCE AND GUARANTEE

4.1 PRE-TEST:

- A. The contractor shall with a representative of the manufacturer conduct a test 3 days before the final test to verify operation of all devices. Any problems must be corrected before the final test.

4.2 FINAL TEST:

- A. Before the installation shall be considered completed and acceptable, a test on the system shall be performed as follows:
 - 1. The contractor's job foreman, a representative of the manufacturer, a representative of the owner, shall operate every building fire alarm device to ensure proper operation and correct annunciation at the control panel. Fan shutdown and door holder circuits shall operate.
 - 2. Conduct a full 24 hour test of battery operation. System shall be put on the batteries for a full 24 hours and all notification appliances shall be operational for a period of 5 minutes.

The supervisory circuitry of the initiating and indicating circuits shall also be verified.

END OF SECTION 28 3111

MURRAY CITY

PLAN REVIEW CORRECTION LIST

Permit Application: E25683
Project Address: 6272 S Highland Dr
Plan Reviewer: Jed Finlinson
Email: jfinlinson@murray.utah.gov
Phone: (801) 264 2708

Fire Department Review

- All new commercial fire alarm system installations and existing system additions or modifications require a plan submittal and permit from Murray City Fire Marshals Office.
- All Fire Alarm systems where more than twenty (20) fire sprinkler appliances are added, removed or relocated, require an approved third-party review.
- All fire alarm systems where more than five (5) horns or strobes are added or relocated, require an approved third-party review.
- Information can be found on our website: <https://www.murray.utah.gov/1748/Fire-Prevention>
- Ensure adherence to all applicable IFC 2021 & NFPA codes.

APPENDIX A

INTERMOUNTAIN PRE-CONSTRUCTION RESPONSIBILITY MATRIX

RESPONSIBILITY MATRIX

Updated January 5, 2021

The following list identifies the majority of the items that are to be included in the capital project build-out. All Owner items need to be coordinated with A/E (Design Team), Contractor, and Owner (Facility Design & Construction and Supply Chain Facility Equipment Planners). For OFOI or OFCI items, Contractor is required to track equipment on construction schedule and to notify Owner of required delivery times, taking into account for equipment lead times.

OFOI - (Owner Furnished / Owner Installed)					
Coordinate location of items with Owner and track within construction schedule)					
ITEM	OWNER/VENDOR	NOTES	Data	Power	Backing
Art	Owner / Owner (Alpine Art)	All artwork to be coordinated with Dan Kohler. Provide power to required artwork.			
Brochure Racks	Owner / Owner	Contractor to provide proper backing.			
Chart Racks	Owner / Owner (Midwest)	Contractor to provide proper backing.			
Copiers, fax	Owner / Owner	A/E to locate where copy/fax/printer is not visual clutter.	Yes	Yes	
Cup Dispensers	Owner / Owner				
Exam Tables	Owner / Owner			Yes	
Systems Furniture (including demountable partitions)	Owner / Owner (Midwest & Steelcase)	Coordinate modesty panels with elec. outlets. Sit/Stand desks to have modesty panel on front. Attention to be given to cord management. A/E to coordinate data and power with Midwest.	Yes	Yes	
Receptionist Desk	Owner / Owner (Midwest & Steelcase)				
Moveable Metal Shelving	Owner / Owner				
Recliners / Draw Chairs	Owner / Owner				
Signage - Exterior	Owner / Owner (IG Group, YESCO)	Provide power and data to required exterior signage. Provide circuits for above ceiling signs. Coordinate thru-wall conduit sleeves with weather barrier. A/E to coordinate traffic signage and Contractor to install. Intermountain Logo Signs (2) 20A Circuits - May vary InstaCare and other Signs (1) 20 A Circuits - May vary	Yes	Yes	Yes
Signage - Interior (including Code Signage)	Owner / Owner (Scribbley, Hightech)	Provide power to required signage. Contractor to track in schedule and notify Owner for when Code Required signage is required to be installed.			
Radiology Equipment	Owner / Owner (See subject matter expert list)	A/E responsible to coordinate final site equipment drawings into Construction Documents from Owner's Vendor.	Yes	Yes	
Clinical Garbage Cans (Clinical, Office, PT, Etc.)	Owner / Owner				
Computers, Printers, Scanners, Keyboards, Mice, etc.	Owner / Owner	In-ceiling & wall mounts, conduits and boxes mounted by Contractor. Computers to be All-in-One, typ. in IMG exam rooms.	Yes	Yes	Yes
Televisions, Digital Projectors, similar devices, etc.	Owner / Owner	These items to be provided by Owner, but A/E to coordinate locations and infrastructure. Contractor to refer to OFCI section.	Yes	Yes	Yes

Keyboard Trays	Owner / Owner				
PACS	Owner / Owner				
Magnetic Marker Boards, Cork Boards, Huddle Boards, Idea Tracking Boards, etc.	Owner / Owner (Midwest)	A/E to coordinate location with Owner.			Yes
Emergency Evacuation Medical Sled (Med Sled)	Owner / Owner	A/E to coordinate location with Owner.			
Supply Area Panels	Owner / Owner	Contractor to provide proper backing, coordinate with Owner.			Yes
Audio/Video (A/V)	Owner / Owner	Intermountain SCO will source & supply the A/V system including specialized cabling (e.g. HDMI, etc.) Refer to CFCI section for Contractor requirements. A/E to identify locations on drawings, coordinate with Owner. Contractor to provide infrastructure, back boxes, conduits, pathways and cabling (from wall side back).	Yes	Yes	
Nurse Notification Call (NNC) System & Devices (Hospital Campus)	Owner / Owner (Hill-Rom)	Hospital local facility team to work with Supply Chain Facility Equipment Planning team to contract directly with Nurse Notification Call (NNC) system vendor (Hill-Rom) for devices, equipment, monitors, etc. A/E to coordinate with Owner and Hill-Rom for all NNC infrastructure required to support the device locations and types designated by Hill-Rom on their site-specific drawings. Hill-Rom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. homeruns to RCB, RCB to device, device to device, etc.), etc. for all NNC devices (e.g. RCB, GSR-10, room devices, etc.). The cabling for the NNC system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hill-Rom.	Yes; see CFCI	Yes; see CFCI	
Staff Assist Notification Call System & Devices (Medical Group Clinics on hospital campuses to match NNC system)	Owner / Owner (Hill-Rom)	Hospital local facility/IMG Ops team to work with Supply Chain Facility Equipment Planning team to contract directly with Staff Assist Notification Call system vendor (Hill-Rom) for devices, equipment, monitors, etc. (from wall side out). Staff Assist Notification system to be coordinated with Hospital Campus NNC system, as applicable, Medical Group Strategic Planner, and IMG Operations Officer. A/E to coordinate with Owner and Hill-Rom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hill-Rom on their site-specific drawings. Hill-Rom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC and Staff Assist Notification Call devices (e.g. RCB, GSR-10, etc.). The cabling for the NNC and Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hill-Rom.	Yes; see CFCI	Yes; see CFCI	

Staff Assist Notification Call System & Devices (Stand-alone Medical Group Clinics)	Owner / Owner (Hill-Rom)	IMG Ops team to work with Supply Chain Facility Equipment Planning team to contract directly with Staff Assist Notification Call system vendor (Hill-Rom) for devices, equipment, monitors, etc. (from wall side out). Staff Assist Notification Call system to be coordinated with Medical Group Strategic Planner and Operations Officer. A/E to coordinate with Owner and Hill-Rom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hill-Rom on their site-specific drawings. Hill-Rom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all Staff Assist Notification Call devices (e.g. RCB, GSR10, etc.). The cabling for the Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hill-Rom.	Yes; see CFCI	Yes; see CFCI	
Patient Monitoring System & Devices (Hospital Campus)	Owner / Owner	Hospital local facilities to work with Supply Chain Facility Equipment Planning team to contract directly with Patient Monitoring vendors for devices, equipment, monitors, etc. (from wall side out). A/E to identify locations on drawings, coordinate with Owner. Contractor to provide all infrastructure including conduits, back boxes, and home-run cabling from Patient Monitoring devices to TEC/TDR rooms that connect to Intermountain's network (Intermountain Siemon certified installer low voltage subcontractor to install). The Patient Monitoring system device to device cabling is by Vendor.	Yes	Yes	
IV Hangar	Owner / Owner	A/E to identify locations on drawings, coordinate with Owner. Backing to be coordinated, if required.			
Sharps Disposal Container	Owner / Owner (Stericycle)	A/E to identify locations on drawings, coordinate with Owner. Backing to be coordinated, if required.			
Infant/Pediatric Security System	Owner / Owner (Totguard)	A/E to identify locations on drawings. This system is to be coordinated with Owner, Women's and Children's Operations, Clinical Programs and Security.	Yes	Yes	

OFCI - (Owner Furnished / Contractor Installed)

Coordinate location of items with Owner and track within construction schedule)

ITEM	OWNER/VENDOR	NOTES	Data	Power	Backing
Automated External Defibrillator (AED)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner, A/E to coordinate recess, semi-recessed, or surface mount options with Owner.			Yes
Time Clocks	Owner / Contractor	Conduit and boxes by Contractor, Coordinate location with Owner.	Yes	Yes	
Paper Towel Dispensers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Soap Dispensers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Toilet Paper Dispensers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Sanitary Napkin Dispensers/Receptacles	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Diaper Changing Station	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Hand Sanitizer Dispensers (Avagard)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.			

Diagnostic Board (Otoscope / Ophthalmoscope)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.		Yes	
Stadiometers, Recessed Scales	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner; coordinate power.		Yes	
Procedure Lights	Owner / Contractor	A/E to coordinate with Owner and Owner's selected Equipment Vendor; A/E to identify locations on drawings, coordinate with Owner; A/E to coordinate the design of the procedure light support structure into drawings. Contractor to provide and install procedure light support structure.		Yes	Yes
Scrub Sinks & Carriers	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and for install coordination.			Yes
IV Track	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Backing to be coordinated, if required.			Yes
Boom Mounting Plates (Equipment, Lighting, Anesthesia)	Owner / Contractor	A/E to coordinate with Owner and Owner's selected Equipment Vendor; A/E to identify boom locations on drawings, coordinate with Owner; A/E to coordinate the design of the boom support structure into drawings. Final site-specific equipment drawings from Vendor to be coordinated with Construction Documents. Contractor to coordinate with Owner and install boom support structure and boom mounting plates. Contractor to coordinate with Owner for ordering and install of boom mounting plates.	Yes	Yes	Yes
OR Clocks	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.	Yes	Yes	Yes
Clinical Clocks	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.		Yes	Yes
Shower Curtains & Rods	Owner (Medline) / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.			
Cubicle Curtains & Tracks	Owner (Medline) / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination.			
Digital Projector Mounts, TV Mounts, & Computer Mounts (Ergotron Brackets/Mounts, etc.)	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to coordinate with Owner for ordering and install coordination. In-ceiling & wall mounts, conduits and boxes provide and installed by Contractor A/E to coordinate A/V requirements. Contractor to pull required A/V cabling.	Yes	Yes	Yes
Radiation Protection Calculations and Certification	Owner / Contractor	A/E to coordinate with Owner in the design phase for coordinating with Medical Physicists Consultants or others, when required. Contractor to coordinate prior to Gyp. Bd. install.			Yes
Patient Lifts	Owner (Liko, subsidiary of Hill-Rom) / Contractor	A/E to identify locations on drawings, coordinate with Owner. A/E to design required support structure for Contractor to install for necessary Liko patient lift connections (e.g. pendant / rails / etc.) Contractor to coordinate shop drawings and installation requirements prior with Liko. Connect to equipment branch if provided.		Yes	
Building Alarms / Medication Refrigerator Alarm / Pharmacy Alarm System	Owner / Contractor	A/E to identify locations and infrastructure on drawings, coordinate with Owner. Contractor to provide conduit and infrastructure into accessible ceiling for access from equipment and/or devices. Local Facility to contract with alarm company for alarm, wire, and monitoring.		Yes	
UPS (MRI, Data Room, CPU, or other similar equipment)	Owner / Contractor	A/E to identify equipment locations on drawings, coordinate with Owner.	Yes	Yes	Yes
iCentra Tracking Boards	Owner / Contractor	A/E to identify locations on drawings, coordinate with Owner.	Yes	Yes	Yes

Distributed Antenna System (DAS) including Public Safety	Owner (DAS vendor selected and managed by Intermountain CTIS/Telecom) / Contractor	A/E to locate infrastructure on drawings to simplify the DAS install. Contractor to track on construction schedule and coordinate DAS install with Owner's Vendor.			
Alertus - Mass Notification System (Public Areas)	Owner (Alertus) / Contractor	A/E to identify locations on drawings, coordinate with Owner.	Yes	Yes	
CFCI - (Contractor Furnished / Contractor Installed)					
ITEM	OWNER/VENDOR	NOTES	Data	Power	Backlog
Communication Boards (e.g. Patient Rooms)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Emergency Phones, Kiosks - Exterior	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. Conduit and boxes by Contractor.	Yes	Yes	Yes
Med Gas Certification	Contractor / Contractor	Contractor to coordinate Vendor with Owner			
Emergency Shower Station / Eye Wash Station	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. These shall meet ANSI and Owner requirements.			
Fire Extinguishers	Contractor / Contractor	A/E to identify types and locations on drawings, coordinate with Owner. 10 lbs. minimum - refer to Intermountain Design Guidelines & Construction Standards.			Yes
Grab Bars (Rest rooms, Radiology, Exam rooms, etc.)	Contractor / Contractor	A/E to identify locations on drawings.			Yes
Coat Hooks (Rest rooms/showers, Exam rooms, Offices/Workstations only)	Contractor / Contractor	A/E to identify locations on drawings.			
Mirrors (Rest rooms, Exams, Radiology, Rehab, etc.)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			Yes
Pneumatic Tube Systems	Contractor / Contractor (SwissLog, Atreo Group, or other approved)	A/E to identify locations on drawings, coordinate with Owner. If SwissLog, verify pricing is per Intalere (Amerinet) Contract Agreement. Design assistance fees are included in this agreement.	Yes	Yes	
Plumbing Shrouds	Contractor / Contractor				
Security Cameras, Video Surveillance	Contractor / Contractor (AlphaCorp/Convergint)	A/E to identify locations on drawings, coordinate with Owner.	Yes		
Voice/Data Cabling (all horizontal cabling)	Contractor / Contractor (Cache Valley Elec., IES Commercial, Data Tech Professionals, Hunt Electric, and others listed in Intermountain Div. 27)	Refer to Division 27 in the Intermountain Design Guidelines and Construction Standards. Coordinate with Owner/User on connections, pairs of fiber/copper, conduits, inner-ducts, etc.	Yes		
Support Bracing/Structure for Radiology and similar equipment	Contractor / Contractor	A/E to coordinate with Owner and Owner's selected Radiology equipment Vendor; A/E to coordinate the design of the support bracing/structure into drawings. Final site-specific equipment drawings from Vendor to be coordinated with Construction Documents. Contractor to coordinate with Owner for install of support structure.	Yes	Yes	Yes
Wall Protection (Incl. Bumper and Corner Guards)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Intrusion Detection	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			

Access Control, Card Readers (Lenel)	Contractor / Contractor (AlphaCorp/Convergint)	A/E to identify locations on drawings, coordinate with Owner.			
Communication Cabling	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
TV System Distribution	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner.			
Audio/Video (A/V)	Contractor / Contractor	Intermountain SCO will source & supply the A/V system including specialized cabling (e.g. HDMI, etc.) A/E to identify locations on drawings, coordinate with Owner. Contractor to provide infrastructure, back boxes, conduits, pathways and misc. cabling (from wall side back).	Yes	Yes	
Nurse Notification Call (NNC) System - Low Voltage Cabling (Hospital Campus)	Contractor / Contractor (Hill-Rom)	A/E to coordinate with Owner and Hill-Rom for all NNC infrastructure required to support the device locations and types designated by Hill-Rom on their site-specific drawings. Hill-Rom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC devices (e.g. RCB, GSR-10, etc.). The cabling for the NNC system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hill-Rom.	Yes	Yes	
Staff Assist Notification Call System - Low Voltage Cabling (Medical Group Clinics on hospital campuses to match NNC system)	Contractor / Contractor (Hill-Rom)	A/E to coordinate with Owner and Hill-Rom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hill-Rom on their site-specific drawings. Hill-Rom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all NNC and Staff Assist Notification Call devices (e.g. RCB, GSR-10, etc.). The cabling for the NNC and Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hill-Rom.	Yes	Yes	
Staff Assist Notification Call System - Low Voltage Cabling (Stand-alone Medical Group Clinics)	Contractor / Contractor (Hill-Rom)	A/E to coordinate with Owner and Hill-Rom for all Staff Assist Notification Call system infrastructure required to support the device locations and types designated by Hill-Rom on their site-specific drawings. Hill-Rom site specific drawings to be coordinated and included in the A/E Contract Documents. Contractor to provide all infrastructure including conduits, back boxes, cabling (e.g. home-runs to RCB, RCB to device, device to device, etc.), etc. for all Staff Assist Notification Call devices (e.g. RCB, GSR10, etc.). The cabling for the Staff Assist Notification Call system will be coordinated and installed by the Contractor/Subcontractor (i.e. low voltage sub). Contractor to coordinate with Hill-Rom.	Yes	Yes	
Patient Monitoring System & Devices (Hospital Campus)	Contractor / Contractor	A/E to identify locations on drawings, coordinate with Owner. Contractor to provide all infrastructure including conduits, back boxes, and home-run cabling from Patient Monitoring devices to TEC/TDR rooms that connect to Intermountain's network (Intermountain Siemon certified installer low voltage subcontractor to install). The Patient Monitoring system device to device cabling is by Vendor.	Yes	Yes	

END OF SECTION

ICRA DOCUMENT

CONTRACTOR TO FOLLOW INTERMOUNTAIN
SPECIFIED ICRA PROCEDURES.

Infection Control Risk Assessment 2.0

Matrix of Precautions for Construction, Renovation and Operations

ICRA 2.0 Infection Control Risk Assessment and Permit	Project Name:		
	ICRA Number:		Requested by
Location of Work Activity		Project Start Date	
Company Performing Work		Est. Completion Date	
Contractor Superintendent		Phone	
Contractor Project Manager		Phone	
Intermountain Project Manager		Phone	
Industrial Hygiene		Phone	
Infection Preventionist		Phone	

1. Type of Activity	
	<p>Type A: Inspection and non-invasive activities. Includes but is not limited to:</p> <ul style="list-style-type: none"> 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.
	<p>Type B: Small-scale, short duration activities that create minimal dust and debris. Includes but is not limited to:</p> <ul style="list-style-type: none"> 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.
	<p>Type C: Large-scale, longer duration activities that create a moderate amount of dust and debris. Includes but is not limited to:</p> <ul style="list-style-type: none"> Removal of preexisting floor covering, walls, casework or other building components. New drywall placement. Renovation work in a single room. Non-existing 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.
	<p>Type D: Major demolition and construction activities. Includes but is not limited to:</p> <ul style="list-style-type: none"> 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.

2. Patient Risk Area			
Low Risk	Medium Risk	High Risk	Highest Risk
Non-patient care areas such as:	Patient care support areas such as:	Patient care areas such as:	Procedural, invasive, sterile support and highly compromised patient care areas such as:
<ul style="list-style-type: none"> Public hallways and gathering areas not on clinical units. 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. 	<ul style="list-style-type: none"> Waiting areas. Clinical engineering. Materials management. Sterile processing department - dirty side. Kitchen, cafeteria, gift shop, coffee shop, and food kiosks. Outpatient exam rooms (no procedures) 	<ul style="list-style-type: none"> Outpatient procedure rooms All acute care units Emergency department Employee health Pharmacy - general work zone Medication rooms and clean utility rooms Imaging suites: diagnostic imaging Laboratory. 	<ul style="list-style-type: none"> All transplant and intensive care units. All oncology units. OR theaters and restricted areas. Procedural suites. Pharmacy compounding. Sterile processing department - clean side. Transfusion services. Dedicated isolation wards/units. Imaging suites: invasive imaging.

3. Class of Precautions				
	Activity Type			
Patient Risk	Type A	TYPE B	TYPE C	TYPE D
Low	I	II	II	III*
Medium	I	II	III*	IV
High	I	III	IV	V
Highest	III	IV	V	V

Infection control permit and approval will be required when Class of Precautions III (Type C) and all Class of Precautions IV or V are necessary.

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.

*Type C [Medium Risk groups] and Type D [Low Risk Groups] work areas [Class III precautions] 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.

4. Surrounding Area					
Unit	Below:	Above:	Lateral:	Behind:	In Front:
Risk group					
Contact					
Phone					
Controls	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization	<input type="checkbox"/> Noise <input type="checkbox"/> Vibration <input type="checkbox"/> Dust <input type="checkbox"/> Ventilation <input type="checkbox"/> Pressurization
Systems impacted:	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other	<input type="checkbox"/> Data <input type="checkbox"/> Mechanical <input type="checkbox"/> Med Gas <input type="checkbox"/> Hot/Cold Water <input type="checkbox"/> Other

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.

5a. Required Infection Control Precautions by Class | Before and During Work Activity

Class of Precautions	Mitigation Activities (Performed Before and During Work Activity)
Class I	<p>Perform noninvasive work activity as to not block or interrupt patient care.</p> <p>Perform noninvasive work activities in areas that are not directly occupied with patients.</p> <p>Perform noninvasive work activity in a manner that does not create dust.</p> <p>Immediately replace any displaced ceiling tile before leaving the area and/or at end of noninvasive work activity.</p>
Class II	<p>Perform only limited dust work and/or activities designed for basic facilities and engineering work.</p> <p>Perform limited dust and invasive work following standing precautions procedures approved by the organization.</p> <p>This Class of Precautions must never be used for construction or renovation activities.</p>
Class III	<p>Provide active means to prevent airborne dust dispersion into the occupied areas.</p> <p>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.</p> <p>Remove or isolate return air diffusers to avoid dust from entering the HVAC system.</p> <p>Remove or isolate the supply air diffusers to avoid positive pressurization of the space.</p> <p>If work area is contained, then it must be neutrally to negatively pressurized at all times.</p> <p>Seal all doors with tape that will not leave residue.</p> <p>Contain all trash and debris in the work area.</p> <p>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.</p> <p>Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy.</p> <p>Adhesive mats must be changed routinely and when visibly soiled.</p> <p>Maintain clean surroundings when area is not contained by damp mopping or HEPA vacuuming surfaces.</p>
Class IV	<p>Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling or, if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements.</p> <p>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.</p> <p>Seal all penetrations in containment barriers, including floors and ceiling, using approved materials (UL schedule firestop if applicable for barrier type).</p> <p>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.</p> <p>Remove or isolate return air diffusers to avoid dust entering the HVAC system.</p> <p>Remove or isolate the supply air diffusers to avoid positive pressurization of the space.</p> <p>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.</p> <p>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 does not require HEPA-filtered air.</p> <p>If exhaust is directed indoors, then the system must be HEPA filtered.</p> <p>Prior to start of work, HEPA filtration must be verified by particulate measurement and must not alter or change airflow/pressure relationships in other areas.</p> <p>Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (e.g., bathroom exhaust) is not acceptable.</p>

	<p>Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator.</p> <p>Contain all trash and debris in the work area.</p> <p>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.</p> <p>Worker clothing must be clean and free of visible dust before leaving the work area. HEPA vacuuming of clothing or use of cover suits is acceptable.</p> <p>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.</p> <p>Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy.</p> <p>Adhesive mats must be changed routinely and when visibly soiled.</p> <p>Consider collection of particulate data during work to monitor and ensure that contaminants do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies.</p>
<p>Class V</p>	<p>Construct and complete critical barriers meeting NFPA 241 requirements including: Barriers must extend to the ceiling, or if ceiling tile is removed, to the deck above, and all penetrations through the barrier shall meet the appropriate fire rating requirements.</p> <p>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.</p> <p>Seal all penetrations in containment barriers, anteroom barriers, including floors and ceiling using approved materials (UL schedule firestop if applicable for barrier type).</p> <p>Construct anteroom large enough for equipment staging, cart cleaning, workers. The anteroom must be constructed adjacent to entrance of construction work area.</p> <p>Workers will be required to wear disposable coveralls during demolition activities. Disposable coveralls must be removed before leaving the work area anteroom.</p> <p>Remove or isolate return air diffusers to avoid dust entering the HVAC system.</p> <p>Remove or isolate the supply air diffusers to avoid positive pressurization of the space.</p> <p>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.</p> <p>Maintain negative pressurization of the entire workspace using HEPA exhaust air systems directed outdoors. Exhaust discharged directly to the outdoors that is 25 feet or greater from entrances, air intakes and windows does not require HEPA-filtered air.</p> <p>If exhaust is directed indoors, then the system must be HEPA filtered.</p> <p>Prior to start of work, HEPA filtration must be verified by particulate measurement and must not alter or change airflow/pressure relationships in other areas.</p> <p>Exhaust into shared or recirculating HVAC systems, or other shared exhaust systems (bathroom exhaust) is <u>not acceptable</u>.</p> <p>Install device on exterior of work containment to continually monitor negative pressurization. To assure proper pressure is continuously maintained, it is recommended that the device(s) have a visual pressure indicator.</p> <p>Contain all trash and debris in the work area.</p> <p>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.</p> <p>Worker clothing must be clean and free of visible dust before leaving the work area anteroom.</p> <p>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.</p> <p>Install an adhesive (dust collection) mat at entrance of contained work area based on facility policy. Adhesive mats must be changed routinely and when visibly soiled.</p> <p>Consider collection of particulate data during work to monitor and ensure that contaminants do not enter the occupied spaces. Routine collection of particulate samples may be used to verify HEPA filtration efficiencies.</p>

5b. Additional details (Controls, Specifications/Materials, Verification method/frequency)

Recommended Noise & Vibration Mitigation Strategies

- Use diamond drills instead of powder-actuated fasteners.
- Schedule noise-making periods with adjacent spaces.
- 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 compression style fittings 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 (flooring glue) instead of mechanical.
- To remove flooring, consider abrasive blasting instead of using a floor scraper.
- Use electric sheers instead of reciprocating saw for ductwork cutting.
- Install exterior man/material lifts.

Recommended Ventilation & Pressurization Mitigation Strategies

- HEPA to exterior.
- Install temporary ductwork.
- Utilize temporary HVAC equipment.
- Vacate the area.
- Install temporary partitions.
- Use carbon filtration to filter odors.

Recommended Impact to Other Systems Mitigation Strategies

- Schedule outages.
- Provide temporary systems.
- Back-feed electricity or medical gases.

6. Minimum Required Infection Control Precautions | Upon Completion of Work Activity

Class of Precautions	Mitigation Activities (Performed upon Completion of Work Activity)
Classes I, II and III	<p>Cleaning:</p> <ol style="list-style-type: none"> 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. <p>HVAC Systems:</p> <ol style="list-style-type: none"> 1. Remove isolation of HVAC system in areas where work is being performed. Verify that HVAC systems are clean and operational. 2. <u>Verify the HVAC systems meet original airflow and air exchange design specifications.</u>
Classes III, IV and V	<p>Class III (Type C Activities only), IV, and V precautions require inspection and documentation for downgraded ICRA precautions.</p> <p>Construction areas must be inspected by an infection preventionist or designee and engineering representative for discontinuation or downgrading of ICRA precautions.</p> <p>Work Area Cleaning:</p> <ol style="list-style-type: none"> 1. Clean work areas including all environmental surfaces, high horizontal surfaces and flooring materials. 2. Check all supply and return air registers for dust accumulation on upper surfaces as well as air diffuser surfaces. <p>Removal of Critical Barriers:</p> <ol style="list-style-type: none"> 1. 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. 2. 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: <ol style="list-style-type: none"> i. Carefully remove screws and painter tape. ii. If dust will be generated during screw removal, use hand-held HEPA vacuum. iii. Drywall cutting is prohibited during removal process. iv. Clean all stud tracks with HEPA vacuum before removing outer hard barrier. v. Use a plastic barrier to enclose area if dust could be generated. <p>Negative Air Requirements:</p> <ol style="list-style-type: none"> 1. The use of negative air must be designed to remove contaminants from the work area. 2. 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. <p>HVAC systems:</p> <ol style="list-style-type: none"> 1. Upon removal of critical barriers, remove isolation of HVAC system in areas where work is being performed. 2. Verify that HVAC systems are clean and operational. 3. <u>Verify the HVAC systems meets original airflow and air exchange design specifications.</u>

Permit Approval

Please note that the IP signature below is approval of the work activity as described, assessed, and documented here. **Should the scope of work change or upon the discovery of additional toxic or biological substances, STOP WORK and seek additional approval and guidance before proceeding.**

Infection Preventionist
Signature

